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OF THE

American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

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ANOTHER COMMITTEE AT WORK

From time to time veterinarians have complained rather bitterly about certain activities attributed to extension workers connected with land-grant colleges. County agricultural agents have come in for their share of this criticism. Likewise, teachers in Smith-Hughes high schools. These complaints have generally been made on the ground that these agencies were dabbling or meddling in animal-disease control.

Isolated examples of aggravated cases have been brought to our attention on a number of occasions during the past eight years. Investigation has usually revealed that the party responsible for the trouble was an over-enthusiastic, aggressive young graduate of an agricultural college, who had received a short course of lectures on veterinary science and thought himself fully qualified to put his knowledge to practical use.

It has been our observation that there are two highly successful "cures" for these cases. One is: "Give him enough rope and he will hang himself." The other, and much to be preferred, is to "go into conference" with the offender, point out the error of his ways, and make a helpful cooperator out of him rather than a disagreeable competitor.

Another thing that has been quite apparent is that the condition complained of has been "spotty." In some sections we never hear a complaint. In others, in certain states, for example, the

condition has seemed to be rather general and has suggested that there was some underlying cause other than that given for the sporadic cases referred to in previous paragraphs. It even appeared, at times, as though some concerted effort was being made to extend some new sort of second-rate veterinary service to farmers.

Unfortunately, as the result of the recent agricultural depression, farmers generally have been in a frame of mind to "cut corners" and any suggestion that they might dispense with professional veterinary services has usually been received with open arms and great expectations. This very thing has undoubtedly been carried to extremes in several sections of the country and, sad to relate, has appeared to have the sanction and approval of persons, who, by their positions, carried considerable weight.

Almost anyone who is willing to sit down and reason the thing out to a logical conclusion will be able to see the outcome. As a matter of fact, the "outcome" has already arrived in several localities. If there is no demand for professional veterinary services in a certain section, no sane, red-blooded veterinarian, who has invested time and money in securing a veterinary education, will even think of locating there. He will go some place else, where he is better appreciated, and the number of such places is increasing rather than decreasing.

If the farmers and breeders in a given locality decide to vaccinate their own pigs against cholera and their calves against blackleg, treat their sheep for stomach worms or have it done by the county agent, and leave the handling of the poultry diseases to the itinerant purveyor of patent feeds, they fail to have the proper appreciation for modern professional veterinary service. More than that—they are defeating their own ends through depriving their communities of competent, dependable veterinary service that is bound to be needed in some great emergency. We have had such emergencies and will have them again. Usually they come without warning and it takes at least four years to produce a veterinarian.

For the purpose of getting at the root of the trouble, the Executive Board of the A. V. M. A., at the Detroit meeting, authorized the appointment of a special committee to conduct a fact-finding investigation. The committee has been appointed by President Ferguson, is now hard at work, and is functioning as the Special Committee on Agricultural Extension Service. The

personnel is as follows: Dr. J. S. Koen, Bloomington, Ill., chairman; Dr. J. H. Mills, Russiaville, Ind.; and Dr. William Moore, Raleigh, N. C.

The investigation now being conducted by the Committee will not be one-sided. Questionnaires are being sent to individuals and organizations in widely separated localities, in an effort to secure evidence of abuses reported to the Committee. Veterinarians have not been absolutely free of blame in some localities, where they antagonized the local farm bureau or the county agent, or refused to cooperate in some local problem because they could not have everything their own way. Most directors of extension service are just as desirous of bringing about harmony as are veterinarians and the A. V. M. A. To that end we commend the work that has been started by this new committee.

MEMBERSHIP DIRECTORY

A new edition of the A. V. M. A. Membership Directory has been authorized by the Executive Board and is now in the course of preparation. It will follow the style of the previous edition, in which the members were listed geographically, by states, provinces, etc. The addition of over 600 new members during the past year makes the publication of the new list rather imperative, a fact that is being emphasized daily by the receipt of inquiries for the new edition. It is expected that the Directory will be ready for mailing some time this month. A copy will be sent each member. If you have changed your address recently and have failed to advise us of the change, do so *immediately*.

Chilean Veterinarian Visits United States

Dr. Julio San Miguel I, of the Instituto Biologico, Santiago, Chile, is in the United States visiting veterinary institutions and getting information on veterinary activities in this country. His itinerary includes New York and Ithaca, N. Y.; Detroit and East Lansing, Mich.; Chicago, Ill.; Madison, Wis.; St. Paul, Minn.; Ames, Iowa; Kansas City, Mo.; Indianapolis, Ind.; Columbus, Ohio; Washington, D. C.; and Philadelphia, Pa. Dr. San Miguel was in Detroit the week of April 21 and paid several visits to the A. V. M. A. offices while in the Motor City. He expects to attend the International Veterinary Congress in London, sailing from New York with the A. V. M. A. party about the middle of June.

PLANS FOR LOS ANGELES

The time: August 26, 27, 28, 29, 1930.
The place: Los Angeles, California.
Headquarters: Ambassador Hotel.

Bird's-eye View of Program

	Monday Aug. 25	Tuesday Aug. 26	Wednesday Aug. 27	Thursday Aug. 28	Friday Aug. 29
Morning	Meetings of Committees	Opening Session	Sectional Meetings	Sectional Meetings	Clinic
Afternoon	Meeting of Executive Board	General Session	General Session	General Session	Clinic
Evening	State Association Conference	Alumni Meetings President's Reception	Banquet	General Session — Papers	

Residential District, Los Angeles

Dr. Stange in Hospital

Dr. C. H. Stange, chairman of the Executive Board of the A. V. M. A., was confined to the hospital during April for a minor operation.

APPLICATIONS FOR MEMBERSHIP

(See January, 1930, JOURNAL)

FIRST LISTING

ANCHONDO, SALVADOR VELESQUEZ Calle 7a No. 67, Apartado postal No. 45, Matamoros, Tamps, Mexico
M. V., Escuela Nacional de Medicina Veterinaria de Mexico, 1923
Vouchers: L. Santa Maria and Nicholas E. Dutro.

BAKER, LESLIE HEITE 207 Livestock Exch. Bldg., Fort Worth, Texas
D. V. M., Kansas City Veterinary College, 1914
Vouchers: N. F. Williams and J. J. Reid.

COOPER, CLARENCE JOHN Kelton, Pembroke, Bermuda
V. S., Ontario Veterinary College, 1902
Vouchers: J. Elliott Crawford and Robert S. MacKellar.

GLOBUS, ROBERT 758 Boswell Ave., Norwich, Conn.
D. V. M., Cornell University, 1927
Vouchers: George H. Ludins and Edwin Laitinen.

GUNN, WALLACE RAYMOND Live Stock Branch, Dept. of Agr., Victoria, B. C.
V. S., Ontario Veterinary College, 1923
Vouchers: W. J. R. Fowler and S. F. Tolmie.

HILL, VERNON B. Nevada, Mo.
D. V. M., Kansas City Veterinary College, 1918
Vouchers: A. T. Kinsley and J. D. Ray.

JASMIN, JOSEPH SYLVIO 12361 Chevelier St., Montreal, Que.
V. S., University of Montreal, 1919
Vouchers: F. T. Daubigny and Chas. B. Baker.

JUDAY, GUY CARLTON 125 Fourth Ave. S., South St. Paul, Minn.
D. V. M., Chicago Veterinary College, 1914
Vouchers: M. E. Schwab and G. E. Totten.

MASON, TALMADGE SCOTT Helena, Ark.
D. V. M., Terre Haute Veterinary College, 1915
Vouchers: John H. Gillmann and Joe H. Bux.

MILKE, GEORGE EMIL Medford, Wis.
D. V. M., McKillip Veterinary College, 1914
Vouchers: T. H. Ferguson and C. F. Van de Sand.

MILLS, JAMES THOMAS Hot Springs, Ark.
D. V. M., Kansas City Veterinary College, 1916
Vouchers: Joe H. Bux and F. R. Osborn.

STEFFEN, MART. R. 1220 Madison Ave., Indianapolis, Ind.
M. D. C., Chicago Veterinary College, 1904
Vouchers: T. H. Ferguson and Thos. W. Munce.

SULLIVAN, EDWARD JOSEPH Georgiaville, R. I.
V. S. Ontario Veterinary College, 1907
Vouchers: J. S. Barber and J. M. Armstrong.

TAYLOR, OTHA R. Toll Gate, W. Va.
M. D. V., McKillip Veterinary College, 1911
Vouchers: C. F. Higginbotham and John L. Core.

Applications Pending

SECOND LISTING

Davis, L. Blake, Box 1, Clementon, N. J.
Harner, James W., Canaan, Vt.
LeGard, Henry Meldrum, 335 Main St. N., Weston, Ont.
Lietzman, Luna O., 226 S. Bright Ave., Whittier, Calif.
Loftus, Jule Bert, Pathology Dept., Colo. Agr. College, Ft. Collins, Colo.
McDonald, W. A., 312 Gazette Bldg., Little Rock, Ark.
Wilcox, Adelbert Edwin, Hyannis, Nebr.

The amount which should accompany an application filed this month is $8.33 which covers membership fee and dues to January 1, 1930, including subscription to the JOURNAL.

COMING VETERINARY MEETINGS

Arkansas Veterinary Association. Marion Hotel, Little Rock, Ark. May 5-6, 1930. Dr. W. A. McDonald, Secretary, 312 Gazette Bldg., Little Rock, Ark.

Southwestern Tuberculosis Conference. Marion Hotel, Little Rock, Ark. May 5-6, 1930. Dr. H. L. Fry, Secretary, 3-4 War Memorial Bldg., Nashville, Tenn.

Connecticut Veterinary Medical Association. Greenwich, Conn. May 7, 1930. Dr. E. H. Patchen, Secretary, 83 New Haven Ave., Milford, Conn.

New York City, Veterinary Medical Association of. Academy of Medicine, 5th Ave. and 103rd St., New York, N. Y. May 7, 1930. Dr. John E. Crawford, Secretary, 708 Beach 19th St., Far Rockaway, Long Island, N. Y.

San Diego-Imperial Veterinary Medical Association. San Diego, Calif. May 7, 1930. Dr. A. P. Immenschuh, Secretary, Santee, Calif.

Kansas City Association of Veterinarians. New Baltimore Hotel, Kansas City, Mo. May 13, 1930. Dr. J. D. Ray, Secretary, 400 New Centre Bldg., Kansas City, Mo.

Chicago Veterinary Medical Association. Atlantic Hotel, Chicago, Ill. May 13, 1930. Dr. J. B. Jaffray, Secretary, 2956 Washington Blvd., Chicago, Ill.

Hudson Valley Veterinary Medical Society. Pearl River, N. Y. May 14, 1930. Dr. J. G. Wills, Secretary, 122 State St., Albany, N. Y.

Southeastern Michigan Veterinary Medical Association. Detroit, Mich. May 14, 1930. Dr. H. Preston Hoskins, Secretary, 537 Book Bldg., Detroit, Mich.

Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. May 21, 1930. Dr. W. L. Curtis, Secretary, 1264 W. 2nd St., Los Angeles, Calif.

Keystone Veterinary Medical Association. Philadelphia, Pa. May 28, 1930. Dr. C. S. Rockwell, Secretary, 5225 Spruce St., Philadelphia, Pa.

Oklahoma State Veterinary Medical Association. Oklahoma A. & M. College, Stillwater, Okla. June 16-17, 1930. Dr. C. H. Fauks, Secretary, 1919 W. Ash St., Oklahoma City, Okla.

Texas, State Veterinary Medical Association of. A. & M. College of Texas, College Station, Texas. June 16-21, 1930. Dr. D. Pearce, Secretary, Box 335, Leonard, Texas.

Texas A. & M. College Short Course for Veterinarians. A. & M. College of Texas, College Station, Texas. June 16-21, 1930. Dr. Mark Francis, Dean, A. & M. College of Texas, College Station, Texas.

North Carolina State Veterinary Association. Charlotte, N. C. June 17-19, 1930. Dr. J. Howard Brown, Secretary, Rich Square, N. C.

South Carolina Association of Veterinarians. Charlotte, N. C. June 17-19, 1930. Dr. M. R. Blackstock, Secretary, 157 Hampton Ave., Spartanburg, S. C.

California State Veterinary Medical Association. Los Angeles, Calif. June 19, 1930. Dr. W. L. Curtis, Secretary, 1264 W. 2nd St., Los Angeles, Calif.

Michigan State Veterinary Medical Association. Lansing, Mich. June 24-25, 1930. Dr. E. K. Sales, Secretary, 535 Forest St., East Lansing, Mich.

Booklet Lists Radio Talks on Foods and Drugs

The housewife who wishes to keep abreast of the times in her knowledge of pure foods and drugs can use to advantage a booklet just issued by the Food, Drug and Insecticide Administration, U. S. Department of Agriculture. The booklet names stations and gives the schedule of talks that experts of the Administration are now broadcasting weekly. The talks deal with various phases of food and drug control. Copies of the booklet, may be obtained by writing to the Food, Drug and Insecticide Administration, U. S. Department of Agriculture, Washington, D. C.

In one series of talks entitled, "Uncle Sam at Your Service," a specialist, "The Veteran Inspector," discusses food products and tells how the enforcement of the federal Food and Drug Act prevents frauds. W. R. M. Wharton, of the New York City inspection district, recently started another series, in which he encourages housewives to read the labels on packages, and tells what information the buyer should expect to find on the label. Once a month, in the noon-hour net-work program of the Department of Agriculture, a food or drug official talks about the work now in progress, to keep pure and unadulterated the foods and drugs entering into interstate and import commerce.

STUDIES IN INFECTIOUS ENTERITIS IN SWINE

V. Coccidiosis in Swine, and Studies on Eimeria Debliecki and Eimeria Zurni*

By H. E. Biester *and* Chas. Murray

Department of Veterinary Investigation

Iowa State College, Ames, Iowa

In a previous publication, the possibility of a group relationship in coccidia, such as exists in the pasteurella and tubercle bacilli groups, was suggested. This possibility appealed to us when we produced an infection in swine by means of a sporulated culture of oocysts obtained from an outbreak of coccidiosis in calves.

Further studies confirm the statements that the size of oocysts eliminated varies, depending upon the stage of infection when they are recovered, and that size and morphology alone cannot be used as a basis for differentiation.

A sporulated coccidial culture of swine origin was fed to chickens, resulting in an infection, as was shown by the elimination of a considerable number of newly formed oocysts. This raised the question whether or not other species, in addition to bovine forms, might be pathogenic for swine. The contacts of swine with other animals on the average farm seemed an additional reason for determining the extent of these group relationships.

Oocysts obtained from six-weeks-old chicks, affected with the bloody form of cecal coccidiosis, were cultured in 1½ per cent potassium dichromate with the addition of 5 per cent bone charcoal. The cultures were aerated by pumping air into the bottom of the tubes or flasks by means of a pipette. These cultures showed sporulation of nearly all the oocysts within four days.

A pig about three months old was fed 50 cc of this sporulated avian coccidial culture. On the following day an additional 25 cc of avian culture was fed. No oocysts were present in the feces of this pig prior to the feeding of the culture. The feces of this subject showed two sporulated forms on the day the second dose of culture was given, while three sporulated forms were found on the subsequent day. All fecal samples during the following four weeks remained negative. The feces were examined in 24-hour com-

*Presented at the sixty-sixth annual meeting of the American Veterinary Medical Association, Detroit, Mich., August 13-16, 1929.

posite samples collected from the pen floors in the morning. The presence of the five sporulated forms can undoubtedly be attributed to the contamination of the feces with feed containing culture forms, carried or spilled from the trough by the animal, or to culture forms passing unaltered through the alimentary tract.

Another pig of the same age was fed two similar doses of a sporulated coccidial culture obtained from another outbreak of avian coccidiosis accompanied by profuse cecal hemorrhage. In the feces of this pig was found one sporulated oocyst, on the day of feeding the second dose of culture. Two sporulated forms were found on the following day. The feces of this pig were also free of coccidial oocysts during the following four weeks, as determined by the sugar-flotation method. These cultures were young and in excellent condition. The absence of evidence to show invasion with multiplication of these coccidia apparently eliminates this form as a factor in swine infections. The coccidia obtained from the ceca of chicks sporulated in from two to four days by the cultural methods employed, while the coccidial oocysts recovered from swine and calves required three or more weeks in which to sporulate by the method used. These facts suggest a wide separation of the avian form from *Eimeria debliecki* of swine.

Oocysts of Ovine Origin

The oocysts eliminated by older sheep and lambs during the course of a low-grade infection appear characteristic and distinct from other forms on the basis of morphology and structure. However, in susceptible animals after a heavy exposure, when oocysts were eliminated in large numbers, the morphology of all but a few resembled that of the *E. debliecki* and *E. smithi*, only isolated forms showing the micropyle or the pear-shaped oocysts. Oocysts obtained from an outbreak of coccidiosis in lambs were cultured in the same manner as the avian, swine and bovine oocysts. The ovine oocysts did not sporulate so quickly as the avian forms, but more rapidly than those recovered from field outbreaks of coccidiosis in swine and cattle. Oocyst cultures of ovine origin showed over 80 per cent sporulated in ten days. Like the other forms studied, they proved to be eimeria, developing four sporoblasts, each having two sporozoites.

In order to determine if coccidia of ovine origin are pathogenic for swine, 75 cc of a sporulated culture was fed to a normal pig about three months old. A few sporulated oocysts were found in

several fecal samples two days after the culture was fed. During the following four weeks no oocysts were found.

Another culture isolated from sheep was fed to another pig of the same age. This pig, like the previous subject, showed a few sporulated forms in the feces two days following feeding of the culture, and it also passed feces free from newly formed oocysts for four weeks. Negative feeding results eliminate this species from further consideration in swine infections, and its more rapid sporulation characteristic suggests a more distant relationship to *E. debliecki* than that of *E. zürni* to *E. debliecki*.

Coccidia Recovered From Swine and Cattle

The relationship of coccidia recovered from swine to those obtained from cattle seems closer. Cultures of these two forms (*E. debliecki* and *E. zürni*) studied by us all required about the same length of time for sporulation. Infection of swine by means of cultures of sporulated oocysts of bovine origin was reported. This was again accomplished in a number of pigs by means of cultures from other sources.

Cultures of swine origin that were demonstrated infective for pigs did not prove infectious for milk-fed calves. On the other hand, a strain of coccidia from an acute outbreak of coccidiosis in calves was sporulated *in vitro* and some of this culture was fed to a calf and two pigs. The calf died three days later with marked inflammation of the intestinal tract. Some of this culture was fed also to a rabbit and a guinea pig, with no untoward results to suggest a coccidial invasion or the presence of toxic products in the culture. This same culture of bovine origin was at the same time fed to two pigs, resulting in invasion and multiplication, as was evidenced by the large number of oocysts eliminated in the feces of these pigs six and seven days after feeding and continuing for more than ten days. The oocysts of bovine origin eliminated by these pigs were again cultured and brought to the stage of sporulation. Then they were fed to another calf and to two pigs. This calf also succumbed three days after feeding the culture, clinical manifestations being apparent only during the last twenty-four hours of life. The pigs fed this culture of bovine origin, which had one previous passage through the pig, eliminated large numbers of newly formed oocysts in the feces six days after culture was fed. Oocysts continued to appear in large numbers for about eleven days, decreasing rapidly thereafter. Material

from this same culture was fed also to a rabbit and a guinea pig, with no indications of intoxication or coccidial invasion.

Summary

1. Experimental coccidiosis has been produced in chickens by means of sporulated oocysts of swine origin although the avian cecal forms are not infectious for swine.

2. Sporulated oocysts of ovine origin did not prove to be infectious for swine.

3. Sporulated swine oocysts administered to milk-fed calves did not produce an infection.

4. Sporulated oocysts of bovine origin fed to pigs resulted in infection. Cultures of oocysts made after one swine passage again appeared infectious for pigs and a calf.

5. With the technic used, the avian forms sporulated in less than four days; those of ovine origin in about twelve days, while the bovine and swine forms required three weeks or more.

6. Although the swine and some bovine coccidia possess a similar morphology and sporulation time and cannot be differentiated by direct microscopic examination, the inability to infect calves with the swine form is in accord with the conception of two or more species.

Discussion

Dr. J. E. Shillinger: In the case where you got the cross-transmission of the infection from the normal to the apparently abnormal host, did the infection remain and produce the usual pathology, and in the case where you mentioned the feeding of some of the test animals with milk, did you regularly find that milk is a partial or complete prophylactic against infection with coccidia?

Dr. Biester: Answering your last question first, we did not experimentally attempt that. I mentioned the feeding of milk to the calves given sporulated oocysts of swine origin and which did not become infected, out of fairness to those who believe milk possesses prophylactic or curative properties in avian coccidiosis.

The pigs which were fed coccidia of bovine origin were not sacrificed. The gross change in the intestinal wall of pigs given coccidia of swine origin consisted of a marked thickening, especially in the smaller animals where the reaction was more severe. The intestinal wall was three or four times its normal thickness. From the exterior it presented the appearance of a very advanced necrotic enteritis intestine, although when opened we did not find the usual diphtheric membranes. The contents were quite adherent and when they were removed we found a mucofibrinous exudate. The outstanding lesion is the great thickening of the intestinal wall.

I might state that the course of each infection is the same. Six or seven days after sporulated oocysts are fed, newly formed oocysts are eliminated in large numbers in the feces. That will continue for a period of ten to sixteen days, after which the number will decrease and the feces will gradually become free. That occurred with both the bovine and swine forms fed experimentally.

Dr. B. T. Simms: Do you find an occasional case that seems to be a chronic carrier of coccidia, such as some people seem to be able to find in poultry, and some people seem not to be able to find? Do you find chronic coccidiosis in swine?

DR. BIESTER: That phase of our studies was purposely omitted because of the limited time allotted. In the past I have used the term "chronic" in cases of coccidiosis, but now there is a question in my mind just what that means. About three weeks or more after pigs were infected, their feces cleared up, that is, if they were kept in pens which were cleaned every day

DR. SIMMS: You don't get an occasional one that does not clear up?

DR. BIESTER: During the summer there were several that continued to eliminate very small numbers of oocysts occasionally, two or three in the entire preparation. In one instance oocyst elimination continued for about five weeks, but I believe that was due to subsequent infections. The factor of immunity also enters in.

If sporulated oocysts are fed day after day to produce, in an experimental way, an exposure such as we would get under field conditions, we find that the elimination of large numbers of newly formed oocysts will not continue indefinitely. After a period of about four weeks the elimination gradually stops, even though we may be still feeding sporulated forms. We may find sporulated or non-sporulated culture forms and an isolated, newly formed oocyst at times. We have been able to find oocysts, some sporulated, in practically every wallow examined on the survey-farms. I would attribute the small numbers of oocysts that are almost continually present in field cases to new infections.

DR. SIMMS: That agrees, of course, exactly with Dr. Johnson's work.

DR. BIESTER: I might state that I was unaware of his work until about six months ago, when his reports came to my attention and I was quite pleased to note the similarity of our results.

DR. L. R. VAWTER: How frequently has coccidiosis been found in sheep?

DR. BIESTER: In our section we have come in contact with possibly four or five outbreaks. There are groups or bands of sheep that do not show symptoms where we find a small number of oocysts. In some of these herds we have a history of diarrhea in lambs. In one outbreak which we observed weekly we found a coccidial infection to be the cause, although previously causes other than coccidia were assigned.

The unfortunate part about coccidiosis is that when the clinical symptoms first manifest themselves, the number of oocysts eliminated has decreased to such a number that the findings do not indicate the severity of the infection. In one case, in which a number of lambs showed symptoms of diarrhea and wasting, only a small number of oocysts were found. The owner pointed to one saying, "I believe that lamb has fever. I think it is going to come down like the others." It showed some traces of beginning diarrhea (feces very soft but not liquid). A sample was taken by means of a rectal curette. The oocysts were so numerous that the flotation preparation developed a heavy scum upon the surface, composed of coccidial oocysts. One week later this lamb showed symptoms and loss of weight similar to the other affected ones, but at this time only a small number of oocysts were present in the feces.

DR. A. T. KINSLEY: How frequently do you find coccidiosis on farms?

DR. BIESTER: We have under observation about twenty farms that we study periodically. We began our observations in connection with the enteritis work and found coccidiosis present on all. Occasionally we may examine a specimen from an animal that may prove negative, but we will also have samples that are positive from others in the same herd. Sometimes oocysts are present in small numbers while in other instances they are very numerous. In addition to that we encountered coccidia in material from sixty-five other sources, that is, in animals submitted for autopsy or slaughter or from herds not regularly observed. We have found it present on about eighty premises.

DR. WARD GILTNER: Have you found any hopeful internal medicant for coccidiosis?

DR. BIESTER: No. From the results presented in another paper it seems to sum itself up into the same old question—sanitation. When we place infected animals on clean ground, it is a matter of only twelve days or so when they will clear up.

DR. GILTNER: What about the treatment of the pens and the yards? Have you done anything about that?

DR. BIESTER: I don't know how resistant the oocysts are. During the winter we made cultures from frozen fecal specimens and obtained sporulation.

DR. B. A. BEACH: Getting back to the question of coccidiosis, especially in poultry, we happen to be one of the guilty ones who have used that term and have been criticized for doing so, possibly justly so. That is not important. But we get, in our diagnosis laboratory, not infrequently, adult hens that are suffering from what we diagnose at least as "chronic coccidiosis" and in the fecal examination we find coccidia for I can't tell how long, but a number of days, in most instances as long as we have kept the hens. Upon slaughter we find lesions, more or less pronounced.

Now, the statement was made that the term "chronic coccidiosis" should not be used, because it has been, I believe, so far, impossible to produce such a condition experimentally. I believe I am right when I state that. There is just one thought that I want to leave in that connection. It would seem to be dangerous to reason from that standpoint, and possibly from the first one also that I mentioned, but the second one for this reason: I believe I am stating the facts when I say that permanent infestation with ascarids in swine has never been produced experimentally. Now, if I am wrong, I would like to be corrected, but I believe I am stating the fact that anyone who has ever tried to produce a permanent infestation with ascarids in pigs has failed.

I remember talking with the late Dr. Ransom one time about that, and he was somewhat perturbed because of it. It would seem that there are conditions which obtain in the field which no one has discovered, and which no one has been able to duplicate experimentally. The same condition may obtain with coccidiosis.

DR. BIESTER: There are several factors to be considered. One is the difference in sporulation time that I mentioned. In the case of the avian form, sporulation may take place in as short a time as twenty-four hours; in fact you will find that a sample collected will show a number of sporulated forms within twenty-four hours. That condition does not prevail in swine where the sporulation time required is about three weeks. The animals that we worked with were not all experimentally induced cases. There were some cases that were brought in from the field and kept in the laboratory and examined every day. Every one of these cases cleared up in the course of two or three weeks, except in one instance it required a longer time. That is, both field and experimental infections in swine cleared up after being kept on clean concrete floors.

ALONG THE PANAMA PACIFIC LINE
The modern City of Panama, Canal Zone

THE PATHOGENIC SIGNIFICANCE OF SPIROCHETES IN SOME WELL-KNOWN PATHOLOGICAL CONDITIONS OF DOMESTIC ANIMALS*

By J. A. HOWARTH

University of California, University Farm, Davis, California

The pathological role of spirochetes in various domestic animals has been reported from time to time by investigators in various parts of the world. In some cases the etiological relationship has not been proved, and in others the spirochetes have been demonstrated to have a more or less casual role in the particular lesion from which they were obtained. The writer has for some time been engaged in the study of the microbial flora of scirrhous cord and rhinohyperplasia of hogs, the feet of sheep affected with foot-rot, and thrush in horses. Special attention has been given to a spirochete always found present under these conditions. These findings may possibly have a bearing upon the etiology of these pathological conditions. The literature on the subject includes many references on the occurrence of spirochetes in diseased conditions of animals; to such publications I will refer briefly, as time does not permit an exhaustive account of the subject.

Theobald Smith[1] submitted a report entitled, "Coarser and Finer Spirilla in the Intestines of Hogs." Dodd[2] described a disease of pigs resulting from a spirochete which he considered the cause of superficial bodily ulcers that averaged about three-quarters of an inch in diameter. Cleland,[3] of West Australia, submitted an article on spirochetes in castration tumors in pigs. King and Baeslack,[4] in their report, stated that they found spirochetes in the blood of hogs suffering from hog cholera. King, Baeslack and Hoffman,[5] the following year, observed spirochetes in the blood of hogs affected with cholera. Nomi and Matsuo[6] published their studies on spirochetes in swine, and, in the work in English at the end of the article, they divide the organisms into two general groups. Schmid[7] described a disease in Southeast Africa, in which pigs were affected with lesions on the skin and tumor-like formations on different parts of the body. Microscopic examination of the material from these lesions showed an immense number of spirochetes. Descazeaux[8] reported finding

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spirochetes in affections of pigs in Chile, but he was unable to reproduce the affection by intracutaneous or subcutaneous inoculations of healthy pigs.

Dios and Zuccarini[9] detected in the blood of horses, in Argentina, spirochetes which they tried to inoculate into sheep and goats, with negative results. Gilbert[10] placed considerable stress on spirochetes which affected bovines in Palestine and which appeared to be identical with *S. theileri.* Catanei and Parrot,[11] in their work on avian spirochetes, were able to preserve these organisms in the ticks of *Argas persicus,* and were able to develop spirochetosis in young fowls by inoculation. Stylaponopoulo[12] reported the occurrence of spirochetes in poultry in Greece. Bossuleut[13] found a spirochete infection of dogs in Algeria. Cassamagnaghi[14] described a spirochete affecting cattle in Uruguay and having characteristics much like those of the one

FIG. 1. Tumor-like formations located in the region of the castration wounds, the weight of which, after surgical removal, was 22½ pounds.

described by Theiler, in the Transvaal, which is transmitted by *B. micropilus.* Krivacek[15] reported an epidemic of Stuttgart disease in Germany in which he found spirochetes in the viscera of seventeen animals autopsied.

Noguchi,[16] in his work on venereal spirochetosis in American rabbits, mentioned the fact that it had the same morphological features as *Treponema pallidium.* The shortest specimen measured was 7 microns, with 6 spirals, and the longest about 30 microns, with 25 to 28 spirals; the average was about 12 to 14 microns. Noguchi,[17] also, reported the presence in wild rats of a spirochete morphologically identical with *Spirochaeta icterohaemorrhagiae.* Ludovic and Blaizot[18] discovered a spirochete affecting the feet of sheep, and classified it as *Treponema podovis.* This organism presents four or five undulations and measures ten to fifteen microns in length.

Clinical Findings

In scirrhous cord, the tumor-like formations located in the region of the castration wounds vary from 2 to 30 cm. in diameter. The weights of these formations, after surgical removal, vary from 2 ounces to 22½ pounds. In the early stages, the mass is very firm; but later, fluctuating areas are found upon palpation. Abscess formation takes place, later breaking down and forming fistulous tracts to the outside. Foul-smelling fluid is constantly emitted, which usually dries over the exterior, forming a crust of varying thickness; in these cases the fluid is enclosed and causes even more intense destruction of tissue.

Fig. 2. Bull nose, showing great thickening of the snout and giving the face a distorted appearance.

In the case of rhinohyperplasia, the face is more or less distorted. There is a severe inflammation of the membranes lining the nose, and in some cases gangrenous and necrotic areas are found. There is a great thickening of the snout; and, in the more chronic and long-standing cases, necrosis of the bones is not infrequent. Some animals show bulging of the bones of the face, because pressure on adjacent structures results in various anatomical alterations. The most common complication is the obstruction of the nostrils, which prevents sufficient passage of air.

Foot-rot is a chronic infectious ulcerative disease of the interdigital structures and subcorneal tissues of the foot, and remains more or less localized to that area. At first there is a slight

lameness and, on examination, the foot is found warm because of the inflammation. Animals badly affected will go on three legs, or, if the fore feet are affected, they rest on their knees, especially while grazing. The hoofs, because of lack of wear, become overgrown and distorted, even curling into a spiral and causing the wear to come on the outer wall of the foot. Much of the horn becomes undermined and detached from the underlying tissues; and in old chronic cases the hoof may be shed, exhibiting fibroid growths of new inflammatory tissue.

Thrush is a diseased condition of the foot, characterized by necrotic erosions of the frog, which emits an ill-smelling, dark-colored fluid. The frog itself becomes frayed and distorted and,

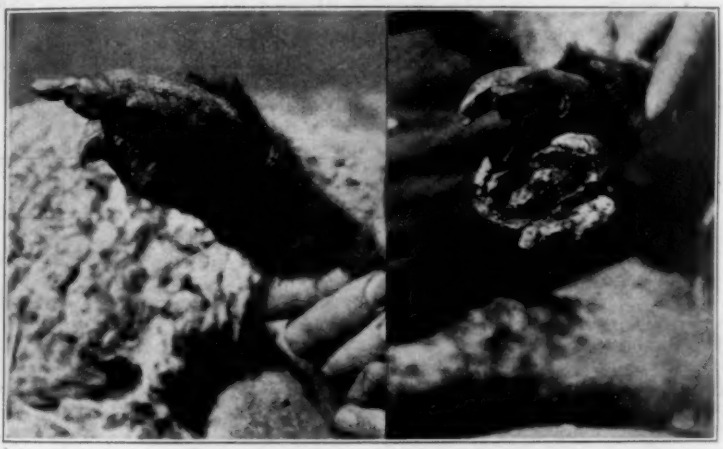

FIG. 3. (Left) The hoofs, because of lack of wear, become over-grown and distorted, even curling into a spiral and causing the wear to come on the outer wall of the foot. (Right) In many cases the horn becomes undermined and detached from the underlying tissues.

in most cases, atrophied. The infection soon involves the sensitive structures and causes tenderness and, in many cases, lameness. This pathological process will in time invade the horny bulbs, and the periople will become infected. The condition, if not attended to, may assume graver proportions and eventually result in canker.

BACTERIOLOGY

For the purpose of making a study of these spirochetes, series of specimens were obtained from animals in widely separated localities. The material was first examined fresh; in all cases a small amount of physiological salt solution was added. In the large percentage of cases examined, the material was received at

the laboratory within a few minutes after removal from the animals affected, and there was little difficulty in observing the living spirochete in the fresh preparations by dark-field illumination. Permanent preparations were made from each animal, and all smears were fixed by gentle steaming with carbol-fuchsin for from three to five minutes. The spirochetes exhibited a considerable degree of flexibility, for they straightened out easily in direct smears. They displayed great regularity in their convolutions when stained in the tissues by Levaditi's method. In no way did they present the right angle bending so characteristic of *Treponema pallida*. The spirochetal ends are blunt, rather than tapering. Motility in contents fresh from the rhinohyperplasia, scirrhous cord, foot-rot and thrush, as shown by dark-field illumination, is of a rotatory nature.

The average measurements of the spirochetes are given in table I.

TABLE I—*Measurements of spirochetes*

	Direct Smears		In Tissue	
	Average Measurements (Microns)	Variations (Microns)	Average Measurements (Microns)	Variations (Microns)
Length.....	9 to 10	6 to 12	7.37	4.38 to 10.22
Number of turns	4	3 to 5	5.88	4 to 7
Spiral depth....	0.2 to 0.6		0.86	0.37 to 1.46
Amplitude.....	0.6 to 0.8		1.15	
Width.....	0.1		0.24	

The uncertainty of our present knowledge of spirochetes makes it seem unwise to try to classify these four organisms or create new species, for they will probably turn out to be variants of one or another. Any attempt to do such a thing would be based on purely physiological grounds.

Attempts at Cultivation

Steps for the isolation and growth of these spirochetes in pure culture were taken in the following manner. A small amount of material, containing a culture medium consisting of ascitic fluid to which a fragment of fresh sterile rabbit kidney had been added, was placed in tubes which were then covered with a layer of sterile paraffin oil and placed in the incubator at 37.5° C. On the third, sixth and ninth days, respectively, a small amount of the culture was withdrawn by a capillary pipette from the bottom

of the tubes and examined under dark-field illumination. In one tube, after incubation for three days, live spirochetes were found present; but it was not possible to carry the culture to a second generation in the same medium. It is therefore evident that, even in a favorable medium, rapid changes may take place which render it unfavorable for the growth of the spirochetes.

Media made up of ascitic fluid, horse serum and sheep serum, respectively, were adjusted to various reactions, ranging from pH 6.5 to pH 8.2. Six tubes, inoculated with material containing

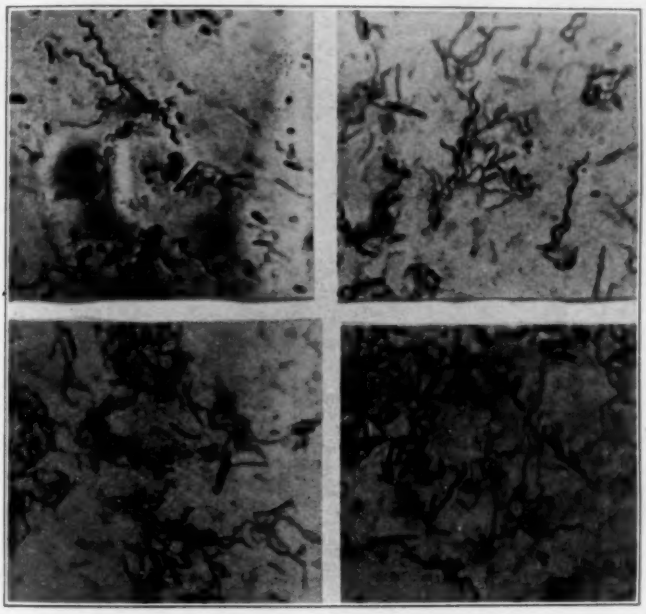

FIG. 4. (Upper left) Spirochetes in smear from scirrhous cord.
(Upper right) Spirochetes in smear from rhinohyperplasia.
(Lower left) Spirochetes in smear from foot-rot.
(Lower right) Spirochetes in smear from thrush.
(Giemsa's stain; oil immersion, 2 mm.; ocular No. 15.)

spirochetes, were covered with a layer of sterile paraffin oil and incubated at 37.5° C. Small amounts of material, taken from these tubes by capillary pipettes, were examined under dark-field illumination after being incubated for 3, 6, 9, 12, 15 and 18 days, respectively, with negative results. Negative results were obtained also by using a medium containing horse serum diluted with two parts of ascitic fluid. To the fluid used, 1 per cent peptone broth was added (1.0 cc of 10 per cent peptone broth to 10 cc of fluid) and the reaction adjusted to pH 7.5. The tubes, after

inoculation, were covered with a layer of sterile paraffin oil, and incubated at 37.5° C.

Location of Spirochetes

The spirochetes are found in the discharges and the necrotic tissue from scirrhous cord, rhinohyperplasia, foot-rot and thrush. These organisms are also found in the tissue just where the line of necrosis and hyperplastic tissue meet. They lie in the minute lymph-spaces between the cells and the various fibrils. It has been impossible to demonstrate spirochetes in the blood smears made from the general circulation and obtained under conditions preventing any contamination with spirochetes on the skin or

Fig. 5. Spirochetes in tissue lying in the minute lymph-spaces between the cells and the various fibrils. (Stained by Levaditi's method; oil immersion, 2 mm.; ocular No. 10.)

mucous membranes. Smears were taken from all the animals affected; and, after an extensive search, it was proved conclusively that their presence in the blood-stream would be accidental. Microscopical preparations and cultures were made from the liver, spleen, lymph-glands, kidneys, bile and urine, but all attempts to locate spirochetes were unsuccessful.

Histopathology

The neoplasms of inflammatory origin, formed at the end of the cord and tunics, are characterized by a slow proliferative process, due in part to an infiltration and proliferation of the fibroblasts, often combined with lymphocytes, polymorpho-

nuclear leukocytes, and endothelial cells. The peripheral portion of the tumorous mass is made up of a dense, fibrous connective tissue composed of spindle or star-shaped fibroblasts, with a con-

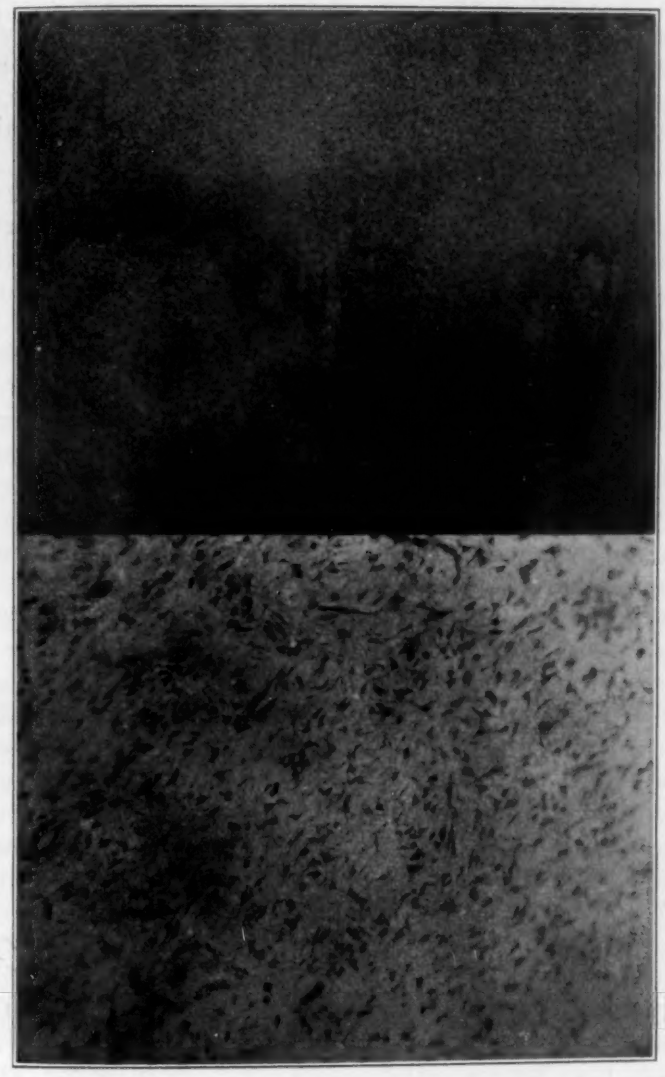

FIG. 6. (Above) Low-power view, showing line of demarcation between the necrotic area and the hyperplastic tissue.
(Below) High-power view of hyperplastic connective tissue.

siderable variation in the size and shape of the nuclei of the cells; occasionally mitotic figures are seen. The stroma contains collagen and elastic fibers and is edematous in places. There is a

large number of arborized blood-vessels throughout the mass. Close to the line of demarcation between the hyperplastic tissue and the moist gangrenous area, occurs an alteration in the blood-vessel walls, some of which may be seen plugged with thrombi and leukocytes. Some of the small veins lying in the area close to the line of necrosis show thrombosis; others exhibit areas of localized leukocytic infiltration involving the area between the intima and media, so that the intima is raised and thrown into convolutions until, in places, its continuity is even broken.

At the line of demarcation between the hyperplastic tissue and the gangrenous area, there is a zone composed of a great number of lymphocytes, polymorphonuclear leukocytes, some fibroblasts, and great numbers of spirochetes. As this zone reaches the gangrenous area, the cells become degenerated, swollen and granular; the nuclei exhibit karyorrhexis, karyolysis and pycnosis; and many cells have completely disintegrated. Droplets of fat, bacteria and cell detritus make up the remaining gangrenous area.

In rhinohyperplasia, the chronic inflammation of the nares lacks the histological features of a new growth, and in fact many cases showed nothing more than localized edematous areas on the mucous membranes. Over the snout there is a progressive hyperplasia of fibrous connective tissue. Long-standing cases display a pronounced inflammation of the periosteal coverings of the bones, later resulting in necrosis and sequestra. Where the sinuses are involved, there is an inflammation and thickening of the mucosa, with an accumulation of necrotic, foul-smelling material, which causes a bulging of the already affected bones.

Throughout the histological examination of all the tumorous masses derived either from scirrhous cord or from rhinohyperplasia, the structure has remained remarkably uniform. There is always that sharp line of demarcation between the gangrenous or necrotic area and the surrounding hyperplastic connective tissue, where the spirochetes are found lying in the minute lymph-spaces between the cells and the various fibrils.

Thrush is characterized by a necrotic ulcerative involvement of the frog (*Furea ungulae*) of the foot. Occasionally in long-standing cases the disease progresses until it involves the deeper structures of the foot. The primary lesion is an alteration and destruction of the velvety tissue of the frog, covering the lower surface of the plantar cushion in the region of the bulbs, where it passes into the perioplic band. There is a moist, necrotic erosion of the part which emits a fetid odor. This necrotic ulcerative

process soon extends beneath the horny frog, loosening it from the plantar cushion as far forward as the apex. There is an involvement of the plantar cushion characterized by an infiltration and proliferation of fibroblasts, combined with lymphocytes,

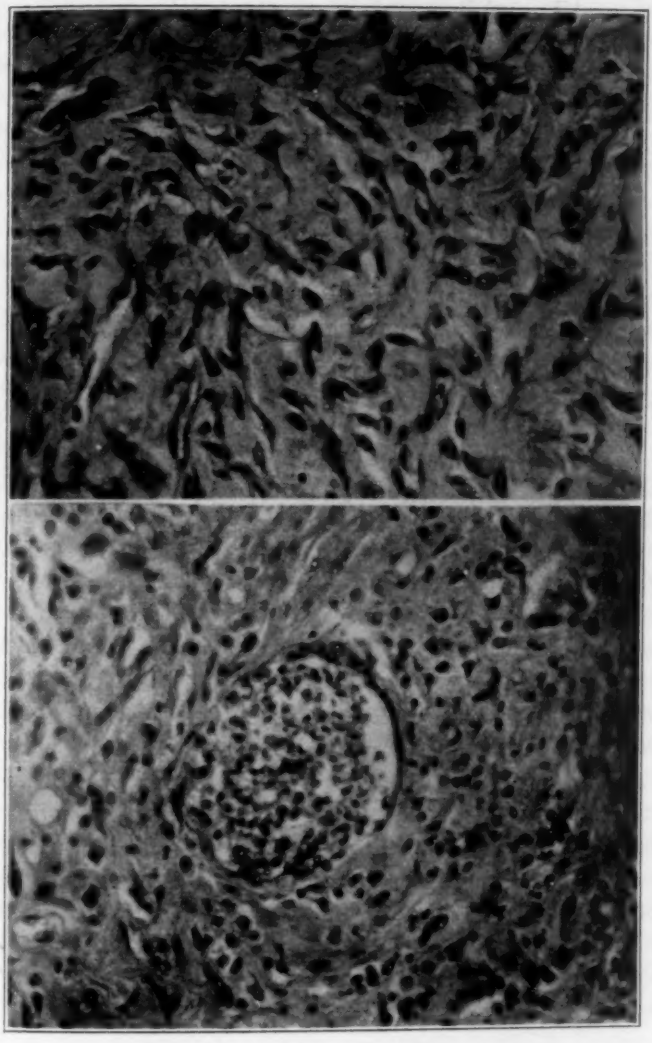

FIG. 7. High-power views of neoplastic tissue made up of dense fibrous connective tissue, having spindle and star-shaped fibroblasts, collagen and elastic fibers.

polymorphonuclear leukocytes, and endothelial cells. The bulbar portion of the sensitive frog is swollen, exhibiting fungoid-like processes projecting out from under the horny frog, which is deeply eroded and macerated.

Spirochetes are found associated with other microbial flora in the necrotic tissue of these lesions, but if a smear is taken from where the lesion joins the healthy tissue, the spirochetes are found in a purer state.

The primary lesion in foot-rot shows a circumscribed redness and swelling, and moist, fetid sweat, usually at the arch of the interdigital space. The epidermis of the interdigital space becomes denuded, exhibiting yellowish-white layers and raw ulcerated areas. As the infection invades the deeper structures, it advances beneath the horny layers, affecting the more vascular and sensitive structures of the foot. When the affection assumes a more chronic state, the hoof starts to become detached, in places, from the underlying tissue, and discharges a foul-smelling inflammatory exudate, having a very offensive odor. This exudate contains an abundance of pus cells, fragments of ulcerating and necrotic tissue, many different kinds of bacteria, and great numbers of spirochetes.

Experimental Inoculations

Experimental work was carried on with hogs affected with scirrhous cord and rhinohyperplasia. I was able to reproduce the two conditions in healthy hogs when small pieces of tissue from the lesions containing spirochetes were inoculated into the snout and scrotal region. It was also possible to produce on other parts of the body characteristic gangrenous lesion like those occurring in scirrhous cord and rhinohyperplasia, by placing a small piece of tissue containing spirochetes into a pocket-like incision in the subcutaneous tissue.

Scirrhous cord and rhinohyperplasia could not be experimentally reproduced by injections of the pure cultures or pooled cultures of organisms other than spirochetes isolated from these lesions. When, however, the mixed cultures containing the spirochetes were injected, the diseases were readily reproduced. Attempts made to transmit the spirochetes to laboratory animals, such as rabbits and guinea pigs, were unsuccessful.

Experimental inoculations with sheep and horses have not been completed, and will be published at a later date. We recognize that definite proof of the causal relationship of the spirochetes to the pathological lesions from which they have been obtained cannot be made until means are established for growing the organism in pure culture; in other words, Koch's postulates have not been fulfilled. We feel, however, that the circumstantial

evidence is sufficiently strong to bring the matter to the attention of other workers with these conditions, in order that we may ascertain whether spirochetes exist to the same extent in lesions of these four diseases among domestic animals in other parts of this country.

Summary

Spirochetes are always found associated with scirrhous cord, rhinohyperplasia, foot-rot and thrush.

The examination of tissues from normal hogs, sheep and horses has not revealed the presence of spirochetes.

Unfortunately the methods of purification, isolation and cultivation of spirochetes, as recommended by Noguchi and others, have so far failed with these organisms.

The only gross and microscopic pathological changes seen in animals affected with these spirochetes are localized to certain areas, such as the snout and scrotal regions of hogs and the feet of sheep and horses.

The spirochetes are located more deeply in the lesions than the other organisms, this fact suggesting their pathogenic influence and etiological relationship in the production of scirrhous cord, rhinohyperplasia, foot-rot and thrush.

The results of the work on this subject are reported in order to give what data I now have, in case these spirochetes should later assume, as they undoubtedly will, a significance greater than that attributed to them at the present time.

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DISCUSSION

DR. N. S. MAYO: Have you tested the arsenicals, for instance, neoarsphenamin, on these animals infected with spirochetes? Such arsenicals have almost a specific action upon these organisms.

DR. HOWARTH: We have been doing some work with different chemicals in the treatment of these conditions. One chemical we have been using the most is antimony and potassium tartrate.

I have used sodium cacodylate in these conditions of rhino-hyperplasia with fairly good results. I haven't had an opportunity to go on with the arsenical preparations as yet.

DR. JOHN REICHEL: May I ask just why do you associate your findings in studies you made of horses with those that you found in hogs? I want to get your reasoning there. You found spirochetes, apparently, in four conditions in three species of animals: horses, hogs and sheep. Wouldn't your problem have been simpler if you had first cleared up your work on hogs? They may not be related. What reason have you to think they are?

DR. HOWARTH: My reason for associating the four different conditions in the same paper is to report what data I now have, and to bring the subject to the attention of other workers in the same field.

You asked if it would not be simpler to clear up the work on hogs first. The project on spirochetes in hogs will be published separately. You also state they may not be related. I did not try to give the impression that they were related, but that the uncertainty of our present knowledge of spirochetes makes it seem unwise to try to classify these four organisms or to create new species at this time.

U. S. Civil Service Examination

The United States Civil Service Commission announces an open competitive examination for junior veterinarian to fill vacancies in the Bureau of Animal Industry, Department of Agriculture, for duty in the field. The entrance salary for junior veterinarian is $2,000 a year. Higher-salaried positions are filled through promotion.

Competitors will be rated on theory and practice of veterinary medicine and veterinary anatomy, physiology and pathology, and meat inspection. The duties are to make antemortem and postmortem inspections of food products; the administration of tests for disease; control and eradication of disease; and sanitary inspection of establishments and plants, and related duties as directed.

Applications for examination must be on file with the Civil Service Commission at Washington, D. C., not later than May 20, 1930.

Full information may be obtained from the United States Civil Service Commission, Washington, D. C., or from the secretary of the United States Civil Service Board of examiners at the post office or customhouse in any city.

SOME OF THE FACTORS INVOLVED IN THE SLIDE-METHOD PULLORUM TEST

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INTRODUCTION

Since February, 1927, when some of the members of this department[1] described an application of Huddleson and Carlson's[2] rapid-method agglutination test to the diagnosis of pullorum infection of fowls, several other workers have reported upon various aspects of the test. Few, however, have written concerning the factors involved in the test. Bunyea, Hall and Dorset,[3] in describing a simplified agglutination test, report on two of the factors—salt concentration and turbidity of the antigen. Gwatkin,[4] Bushnell and Brandly,[5] and Edwards and Hull[6] have reported on the efficiency of the test as compared to the tube method. The present paper deals with nine factors that have a direct bearing upon the preparation of the antigen and upon the interpretation of the test. They pertain to:

I. The bacterial suspension
   (a) Density
   (b) Sodium chlorid content
   (c) Effect of heat
   (d) Age
   (e) Single and multiple strains
II. The medium upon which the antigen is grown
   (a) Effect of hydrogen-ion concentration upon:
      (1) Agglutination
      (2) Growth
III. The agglutinating characteristics of serum from:
   (a) Actively immunized fowls
   (b) Infected fowls.

METHODS OF EXPERIMENTATION

A standard bacterial suspension for comparison: As a basis from which to proceed in studying the factors involved, the test and technic as previously described,[1] but slightly modified, were used. Briefly, the bacterial suspension consisted of one strain of *Salmonella pullorum* grown on nutrient agar (pH 7.5) for 48 to 72 hours, washed off, filtered through glass wool, centrifuged once and suspended in a .5 per cent phenol and 12 per cent sodium

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chlorid solution, so that the resulting density of the suspension was 50 times greater than tube 1 of McFarland's nephelometer. For the most part two standard suspensions were used. The strains employed were B. A. I. 20, furnished, as the designation would indicate, by the U. S. Bureau of Animal Industry, and K-281, a culture isolated three years ago at this laboratory. Both strains were isolated from adult hens. Except where otherwise noted, the antigen-serum dilution was 1-50.

Density: A bacterial suspension having a turbidity 50 times greater than tube 1 of McFarland's nephelometer has a density of approximately 6 mm. when measured with a Gates nephelometer. The qualifying word "approximately" is used because the Gates apparatus is not so dependable for accurate determinations as is the McFarland, but it is more suitable for rapid work.

Four suspensions, prepared exactly like the standard, but having densities of 4, 6, 8 and 10 millimeters, when measured with the Gates apparatus, were tested on a number of known positive and negative sera. The 6-mm. suspension was superior to the others. It was discovered, however, that the suspension 50 times greater than McFarland's tube 1 is more satisfactory to use than the one measuring 6 mm. with the Gates apparatus. As a result, the Gates nephelometer is now used to get the approximate density, but in the final adjustment of the turbidity, McFarland's is used.

Sodium chlorid content: The sodium chlorid content of the suspension was varied from 1 to 14 per cent, in 2 per cent steps. Suspensions containing no salt and physiological salt were tested also. Variation in the amount of salt did not appear to affect the agglutination of recently prepared suspensions.

Effect of heat: One lot of the standard antigen was divided into three portions. One portion was heated for one hour at 60°C. in a water-bath, a second for 30 seconds at 100°C. over a flame, and a third was unheated. When tested with known positive and negative sera, the unheated lot and the lot heated for one hour at 60°C. gave identical results. The agglutinability of the lot heated for 30 seconds at 100°C. was impaired.

Age: Suspensions 1, 10, 15 and 21 days old, containing physiological salt and 12 per cent salt, were tested simultaneously and showed no apparent differences in agglutinability. However, when composite antigens made of the several lots containing physiological salt and of those containing 12 per cent salt were tested 10 days after being combined, the former was much in-

ferior to the latter. Agglutination occurred much more slowly, was not so pronounced, the flocculi were smaller, and with about 16 per cent of the positive sera no agglutination took place. A sample of 12 per cent salt antigen, approximately 10 months old, was agglutinated slowly, and frequently not completely.

When the standard antigen was incompletely agglutinated, the 10-months-old antigen failed entirely to be agglutinated. The antigens were kept at a temperature of 8° to 10°C.

Single and multiple strains: A lot of standard suspension, made with culture K-281, and one with B. A. I. 20 were compared to a lot made of two cultures identified as P3 and P10, and with another lot containing P3, P10, K-281 and B. A. I. 20. The two latter suspensions were prepared by Dr. Meade Ferguson, Biochemical Laboratory, Virginia State Department of Agriculture. There was no apparent difference in the way in which these suspensions were agglutinated. All strains, however, had been selected because of the rapidity and completeness with which they could be agglutinated.

The Medium Upon Which the Antigen is Grown

Effect of reaction upon agglutination and upon growth: Bacterial suspensions grown on nutrient agar, having a pH ranging from 6.6 to 7.8, were agglutinated to the same extent by positive sera. An advantage in favor of the media having the lower pH values was that the yield of suspension was greater on them. This is in keeping with the information in Dernby's table[7] which indicates that the optimum reaction for organisms in the paratyphoid group is pH 6.4 to 7.2.

Agglutinating Characteristics of Serum

Actively immunized and infected fowls: During the course of testing several thousand samples of serum it was observed that the agglutinating reactions varied somewhat in appearance. The majority of the reactions were characterized by the formation of rather large flocculi, which settled to the bottom of the resultant clear saline solution. Occasionally, however, very minute, uniformly distributed, white particles formed, instead of the large, irregularly shaped, irregularly distributed flocculi. These particles are unlike the minute bran-like flakes that sometimes appear in the serum and which float on top of the serum-antigen mixture. It was thought that possibly the coarse flocculi were an indication of an active infection and the fine particles of an active immunity as a result of infection, possibly during chick-

hood. To determine this point, 21 non-reacting pullets were divided into three flocks of seven birds each.

Flock 1 was inoculated intra-abdominally with a live culture of *Salmonella pullorum* on three occasions, at 7- to 14-day intervals. Each received .5 cc of an agar-slant culture which had been suspended in physiological salt solution. The density of the suspension was equivalent to tube 3 of McFarland's nephelometer. The culture was obtained from the ovary of a hen, but had been isolated several months prior to the beginning of this experiment.

Flock 2 was inoculated intra-abdominally with a killed culture prepared in the same manner as the live one, except that it was subjected to heating for one hour at 60°C. in a water-bath. Four inoculations were made at intervals of four to five days.

Flock 3 was untreated. Consequently it was the control flock.

After agglutinins appeared in the sera of the birds in the two inoculated flocks, tests were run periodically with the standard antigen and also with tube-method antigen. The tube-method antigen was made by diluting the slide-method antigen 50 times with physiological salt solution. This is considered the only fair and accurate way of comparing the slide- and tube-method tests. When run in this manner, equivalent amounts of the same bacterial suspension, but of different densities, are combined with identical quantities of serum. When this is done the same quantity of agglutinins has an opportunity to agglutinate the same number of microorganisms. With each test serum-antigen dilutions of 1 to 25, 1 to 50, 1 to 100, and 1 to 200 were run.

The occurrence of fine and coarse flocculi in the positive tests was extremely inconsistent. These phenomena occurred in tests run on both the infected and immunized birds and frequently in different dilutions of serum and antigen in the same test. These phenomena occurred in both slide- and tube-method tests and apparently have no practical significance.

SUMMARY

In order to study the factors involved in the slide-method agglutination test a standard suspension or antigen was arbitrarily selected. It was compared with similar antigens in which several important factors were systematically varied. Among these factors were studied those that involve the bacterial suspension, the medium upon which the antigen is grown, and the serum of the bird.

Conclusions

1. The most suitable density for the bacterial suspension is still one that is 50 times greater than that of tube 1 of McFarland's nephelometer. At a reading of 6 mm. with a Gates apparatus, the turbidity is approximately the same, although the final adjustment of the antigen should be made with McFarland's tube 1.

2. An antigen containing no salt is agglutinated as readily as one containing 14 per cent, when freshly prepared. Suspensions containing little or no salt appear to deteriorate much more rapidly than those with the larger amounts.

3. Moderate heat (60°C. for one hour) does not improve the suspension and extreme heat (100°C. for 30 seconds) impairs its efficiency.

4. The bacterial suspension containing 12 per cent salt deteriorates very slowly if kept at a temperature of 8° to 10°C. Suspensions containing physiological salt appear to deteriorate rapidly three weeks after preparation.

5. A single, rapidly and easily agglutinated strain of the organism is as suitable for the suspension as two or four such strains. For practical purposes, however, it is probably safer to employ a multi-strain antigen.

6. Nutrient agar having a pH of 6.6 to 7.2 produces a heavier growth of antigen than does that of pH 7.5 and the change in reaction of the medium has no apparent effect on the agglutination of the suspension.

7. The occurrence of occasional reactions characterized by the formation of minute, uniformly distributed particles instead of the usual large flocculi has no significance as regards immunity or infection on the part of the bird.

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TREATMENT OF FOOT-ROT IN CATTLE*

By W. F. BURLEIGH, *Oriskany Falls, N. Y.*

In this paper I have not attempted to cite any one particular case of foot-rot but have jotted down briefly my method of procedure in some of the cases that have been turned over to my care. If there is any work in the whole field of veterinary practice that requires the exercise of patience to the superlative degree, it is dressing the feet of the ordinary bovine. Untrained in foot-handling, the unreasoning cow is an adept in placing a foot in apparently several places at the same time, as any of you who have bandaged her foot, I think, will agree.

Foot-rot, or necrobacillosis, in cattle is of quite common occurrence in my vicinity. The natural surroundings are, no doubt, a contributory factor, since the country consists largely of rocky hills with many springs and swampy places in the valleys. Feet are readily bruised in soil of this character and where contamination exists the infection gains easy entrance. Heavy, well-fed cows kept in warm stables and on concrete floors seem more susceptible, although it does occur in lighter ones, including young heifers. Once gaining entrance, the disease progresses with great rapidity. It is most frequently present in the interdigital space, and the attendant swelling and intense pain soon check lactation and bring about inappetance and a rapid loss of flesh.

Within recent years I have had good success in treating this disease, if called sufficiently early, by means of an ointment composed of sulphuric acid, Lugol's solution, wood charcoal, and pyoktannin in an ointment base. This is applied thickly over the diseased area, covered with cotton and bandage, and left in place from three to four days, at the end of which time it is removed, together with all the necrotic tissue it is possible to get easily. If the necrotic tissue comes away cleanly, the wound is left open and treated twice daily with a solution of lead acetate and zinc sulphate, of each four ounces to one gallon of water. If the necrotic tissue does not come away readily, a second or third application of the ointment is made. More than this are seldom necessary.

Animals exhibiting symptoms of intense pain are usually quickly relieved in this manner, often within a few hours, to the

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great satisfaction of the owner and yourself. Sometimes, before my services are sought, home treatment has been attempted with various drugs, among which is strong muriatic acid, which seems to be quite popular with the laity. Liberal application of this caustic often destroys a considerable portion of the healthy surrounding tissues and leave a sad looking state of affairs. Such cases, and others due to neglect or improper treatment, often terminate in serious joint and tendon infection. At this stage the patient is emaciated and a likely candidate for the ten-dollar sale or the bone-yard.

In the past, it has been the custom, in this vicinity, to dispose of these cows for the price of the hide when further treatment seemed hopeless, or to put them out of the way humanely to relieve their suffering, or to let them die according to the personal disposition of the owner. Consequently, my suggestion that operative removal of the offending claw would be advisable has, in some instances, brought expressions not only of surprise but even consternation. "Why, I never heard of such a thing! How will she be able to walk? She can't walk on one toe, can she? Oh! We might better let her die than do that."

As a matter of fact, these operated individuals, upon recovery, seem to walk practically as well as ever, except possibly over extremely rough surfaces, where projections are allowed to come in contact with the severed stump. In one particular case I was unable to convince the owner that an operation would be best until one of these buyers of bologna cows had refused to buy the cow at anything more than her hide. Finally I offered to operate, with the provision that I collect my fee only in case the animal recovered. She had been a very good dairy cow and, being young, I had confidence that she might continue to be. While I had done but few operations of this nature up to that time, they had been successful and I wanted more experience.

The owner agreed to this, the operation was performed, recovery was prompt, and at an auction, held a few months later, she brought as good a price as any in this dairy of thirty good cows. Soon after this I was obliged to make a similar offer to obtain the privilege of operating another apparently hopeless case. The operation was performed, recovery was good from the first and a few months later a careful cattle-buyer, who deals in a big way, took this cow along with a few others upon his own selection.

Here, then, by proper selection of cases, and a little diplomacy with the owners, is another opportunity to prove our worth as veterinarians in the community. In the majority of these cases, the joint of but one claw is involved. This is swollen and projects beyond the other, thus preventing the animal from using the healthy one. The comparatively simple operation of removing the diseased claw allows the use of the healthy one, brings immediate and marked relief to the animal and starts it well along the road to recovery.

In preparing for this operation, the animal first is given from one to two ounces of chloral hydrate in solution as a drench or per rectum. It is then cast by the double half-hitch method and secured in lateral recumbency, with the diseased claw uppermost. A local anesthetic is then applied over the plantar nerves and also along the line of incision in the coronary region. While waiting for the anesthetic, the foot is cleaned with a warm antiseptic solution.

As soon as the foot is anesthetized, which may be determined by pressure on the coronary, a tourniquet is applied and an incision made through the coronary region, severing the claw at the first digital joint. The projecting end of the second digital bone is then removed with a saw, as far back as possible. The denuded surface is then covered with a powder dressing composed of three parts powdered nut-gall to one part powdered copper sulphate. This is covered with cotton and bandaged liberally and firmly. The bandage is left in place three days, after which time it is removed and the operative wound dressed openly, two or three times daily by the owner, with the lead and zinc solution previously mentioned.

A prompt and uneventful recovery has been the result in all the cases I have operated, with one exception. In this case it was necessary later to open and drain a suppurating tendon-sheath just above the ankle. This particular cow was so emaciated before treatment that it seemed hopeless to operate, yet she made a good recovery. In certain cases the disease attacks the skin above the hoof instead of locating in the interdigital space. Here it seems to take on different characteristics. Whether this is due to contamination with other microorganisms or not, I am not prepared to say. The skin over the affected area becomes dry and dead. Sloughing occurs, leaving large cracks and fissures from which ooze a suppurative and sanguineous liquid with an offensive odor. The deeper structures may become involved,

making deep, ugly-looking wounds. This is usually found in but a single isolated case here and there.

There came a call one day last summer, from the top of one of our largest range of hills, about twelve miles away. This owner had twelve cows, seven of which were affected. He was a rather nervous and sensitive individual and I received the following greeting: "Hello, Doc, my cows are in a terrible mess and I think I had better sell them and quit." The stable was very neat and dry, with plank floors. The barnyard was dry, as was the pasture, except for swampy holes which in my mind were the source of his troubles.

It was indeed a mess, these seven, some with two or more feet affected, large patches of skin dead and dying and sloughing off with the attendant odorous discharge. To facilitate treatment, these cows were kept in the barn and treated two and three times daily by removing the dead skin and crusts and applying the lead and zinc solution. Copper sulphate also was added in this case but was later given up, as it seemed to make the parts more sensitive.

This treatment was continued by the owner for a few days, when he called me up saying, "The cows are getting worse, come up and see what we had better do." Upon arrival I found them considerably better, instead of worse. The owner said, "Doc, here is a prescription one of my neighbors has given me, saying it will cure these cows right up." It read, "Take zinc sulphate, so much, lead accetate, so much, copper sulphate, so much, in so much water." The very identical drugs we were using! At this stage, the infection being practically controlled, I decided to change the application to one composed of an antiseptic in oil, when the time of recovery depended only upon the time for new tissue to form.

Tuberculin Test

The farmers of Brown county, our closest Ohio neighbor, in planning to make a tuberculin test of their milch cows, are proceeding in the right way that will establish a reputation for their milk products that will be most profitable. If will fast become known that they produce and market the very best milk from healthy animals and this will increase patronage as well as secure to them the very highest prices for their products. It does not hurt to do things well. The fact that hundreds of farmers favor such test is most commendable to them.

Maysville (Ky.) Independent.

A COMPARISON OF THE RESULTS OF THE STANDARD MACROSCOPIC AGGLUTINATION TEST AND HUDDLESON'S RAPID METHOD IN THE SEROLOGIC DIAGNOSIS OF BRUCELLA INFECTION OF CATTLE

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Since Huddleson and Carlson[1] reported the results of the rapid agglutination test for the diagnosis of infectious abortion on 2000 samples of bovine sera, many samples of such sera have been tested in different laboratories for the presence of Brucella agglutinins, using the standard tube macroscopic agglutination test and the concentrated antigen on a glass plate as advocated by its originators. The results of the two tests represent in most cases unpublished, yet supportive, evidence confirming Huddleson's observations.

Lienhardt and Kitselman[2] tested 600 samples with the long or standard tube macroscopic agglutination test and the rapid method described by Huddleson. These authors concluded that Huddleson's rapid method was highly satisfactory, and for routine diagnosis, a preference was expressed for it. Likewise Palmer and Baker,[3] in testing 16 lots of sera, including 609 samples, found that the results of the rapid test agreed closely with the standard tube method and required no expensive laboratory equipment. A preference was expressed also for the rapid agglutination method in routine testing for Brucella agglutinins by these investigators. Damon[4] found Huddleson's method more sensitive than the standard tube test, but contradictory results in a large series of tests were obtained in a negligible number of cases.

AGGLUTINATION OF BLOOD AND MILK SERA

In connection with the routine testing of blood sera for Brucella infection, an opportunity was provided the writers to compare the results of the standard tube macroscopic agglutination test and Huddleson's rapid test. Approximately 6000 samples of bovine

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blood and milk sera are included in this report. A majority of the samples were sent to the laboratory by veterinarians and physicians for routine diagnosis of Brucella infection in cattle and man. The results of the agglutination tests were reported on the basis of the standard method. Each month the results of the standard tube macroscopic and rapid agglutination methods on the same samples were tabulated for comparison and finally computed on the basis of total samples tested (table I).

Antigen

The antigen used in the comparison of the standard tube macroscopic agglutination test and Huddleson's method was

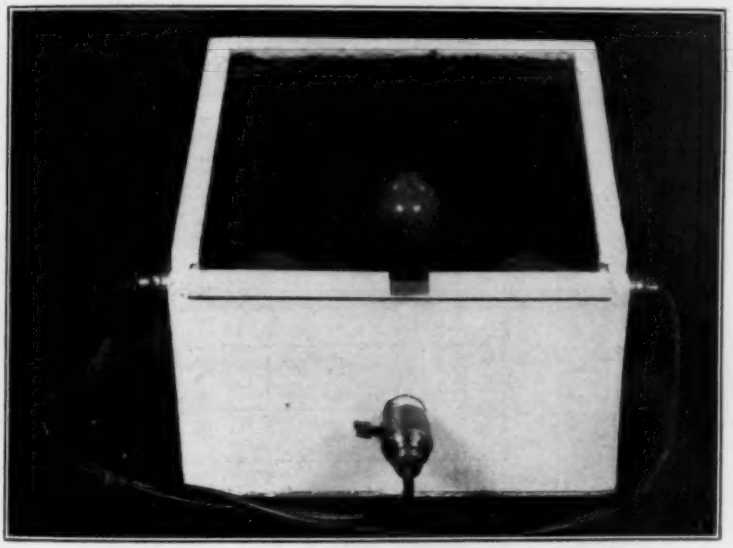

Fig. 1. The supporting box with ruled glass plate in position.

made from a single strain of Brucella (Traum). This porcine strain has been under artificial cultivation in our laboratory for seven years. The bacterial suspension used for the antigen was grown on pork and chicken infusion agar (pH 7.2), and allowed to incubate for 72 hours at 37° C. The antigen used in the standard tube test was suspended in a .5 per cent phenolized physiological salt solution and diluted to correspond with tube 1 of McFarland's nephelometer. The Huddleson antigen was suspended in 12 per cent salt solution containing .5 per cent phenol. To some of the antigen a drop of saturated aqueous solution of gentian violet was added to each 100 cc for additional

TABLE I—*Results of rapid and standard agglutination test, cow blood sera and cow milk sera, January to August, inc., 1929*

SPECIMENS	TESTED	RAPID								STANDARD							
		POSITIVE		DOUBTFUL		POS. & DOUBT.		NEGATIVE		POSITIVE		DOUBTFUL		POS. & DOUBT.		NEGATIVE	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Blood Sera	5702	1124	19.71	376	6.59	1500	26.30	4202	73.70	1127	19.77	372	6.52	1499	26.29	4203	73.71
Milk Sera	464	168	36.21	45	9.70	213	45.91	251	54.09	169	36.42	37	7.98	206	44.40	258	55.60

preservative purposes. The density of the antigen varied slightly in different lots, but was never less than tube 10 of McFarland's nephelometer, and oftentimes denser.

Dilutions

Each blood and milk sample was mixed with antigen in the standard tube test in dilutions of 1:50 and 1:200. Complete

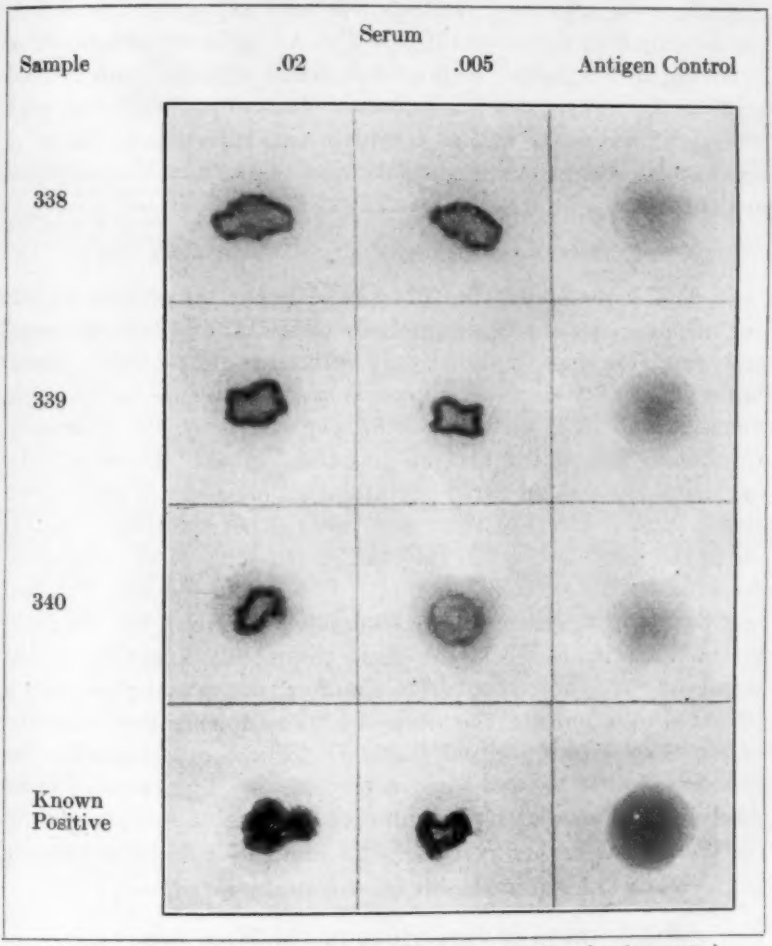

Fig. 2. Agglutination of three positive samples (338, 339, 340) and antigen control for each at left.

agglutination in the latter was regarded as positive, while agglutination in 1:50 was looked upon as doubtful. Likewise, partial agglutinations in both dilutions were regarded as doubtful. After incubation at 37° C. for 24 hours, the results were read. In the

rapid method .02 cc and .005 cc of serum were separately added to .1 cc of Huddleson's antigen on a glass plate, ruled in 1-inch squares. The glass plate was fitted to a square box of the same size, the inside of which was painted black (figure 1). Four 25-watt, frosted, light bulbs warmed the plate after serum and antigen were mixed. The rapid tests were read eight to fifteen minutes after mixing the antigen and the serum. Complete agglutination in positive controls was used as an additional time guide in reading the results (figure 2). An agglutination in .02 cc of serum was regarded as doubtful, while agglutination in .005 cc of serum was regarded as positive. Partial agglutination with .005 cc of serum, as well as complete agglutination in .02 cc of serum, with a negative agglutination in .005 cc also was regarded as doubtful.

Percentages of Reactions in 5702 Bovine Sera

Of 5702 samples tested, 1124 (19.71 per cent) gave complete agglutination by the rapid method, while 1127 (19.77 per cent) gave complete agglutination by the standard tube method. Three hundred seventy-six (6.59 per cent) were doubtfuls in the rapid method, and 372 doubtfuls (6.52 per cent) by the standard. Combining the positives and doubtfuls in the standard tube agglutination and the rapid agglutination methods, it was shown that a total of 1500 (26.3 per cent) were either positive or doubtful to the rapid test, while 1499 (26.99 per cent) were positive or doubtful by the standard method. Four thousand two hundred and two (73.70 per cent) were completely negative by the rapid method, and 4203 (73.71 per cent) completely negative by the standard. It is noted that from January through August, over a period of eight months, the totals of 5702 samples gave a variation of less than .1 of 1 per cent (table I). The comparisons for the first five months showed some discrepancies. The cause of these discrepancies was later attributed to the use of sodium chlorid containing too high a percentage of impurities and the keeping of the stock antigen in soluble glass containers.

Percentage of Reactions in 464 Milk Samples

A comparison of the results of 464 milk samples tested by both methods from January to August, 1929, revealed a variation of .21 per cent in the total positives, 1.72 per cent in the total doubtfuls, and 1.51 per cent in the total negatives (table I). In view of the small number tested, the variation noted in the re-

TABLE II—*Results of rapid and standard agglutination tests, bovine sera, June 1, 1929*

		POSITIVE	DOUBTFUL	POSITIVE AND DOUBTFUL	NEGATIVE	TOTALS
STANDARD		108	35	143	352	495
Rapid	Positive	95	9	104	3	107
	Doubtful	12	18	30	9	39
	Positive and Doubtful	107	27	134	12	146
	Negative	1	8	9	340	349
	Totals	108	35	143	352	495

Index of agreement of positive equals..... .8079
Index of agreement of combined positive and doubtful equals..... .9405
Index of agreement of negative equals..... .9659
Index of agreement of the two tests equals..... .9015

sults in milk samples may not be significant, yet the index of agreement is below that observed in testing bovine sera.

INDEX OF AGREEMENT IN AGGLUTINATION REACTIONS

To bring out the actual index of agreement on each sample tested, with reference to the positives, combined positives and doubtfuls, and negatives, a summary of the results during the month of June, 1929, on 495 blood samples is given in table II. Using 1 as the index of perfection, it is noted that agreement between the two tests on negative results is .9659, while the index of agreement between the two methods on positive samples is

TABLE III—*Results of rapid and standard agglutination tests, bovine sera, January to August, inc., 1929*

		POSITIVE	DOUBTFUL	POSITIVE AND DOUBTFUL	NEGATIVE	TOTALS
STANDARD		1127	372	1499	4203	5702
Rapid	Positive	1020	89	1109	15	1124
	Doubtful	96	205	301	75	376
	Positive and Doubtful	1116	294	1410	90	1500
	Negative	11	78	89	4113	4202
	Totals	1127	372	1499	4203	5702

Index of agreement of combined positive and doubtful equals..... .9406
Index of agreement of negative equals..... .9786
Index of agreement of the two tests equals..... .9362

.8079. However, when the doubtfuls to each test are combined with the positives, the index of agreement is .9405. In comparing the results of the negatives, combined positives and doubtfuls on all samples, the index of agreement is .9015. Applying this method of comparison on the total of 5702 samples of bovine blood sera (table III), the index of agreement between negatives, combined positives and doubtfuls is .9786 and .9406, respectively. The index of agreement between the positives, combined positives and doubtfuls, and negatives in the two methods on the total of 5702 bovine sera is .9362.

It is of interest to note that of 1127 samples of bovine sera which proved positive to the standard tube method, 1020 were positive to the rapid test. Ninety-six were partial or doubtful, while 11 of the positive samples to the standard test were distinctly negative to the rapid test. On the other hand, of 4203 samples negative to the standard tube test, 15 were distinctly positive to the rapid test, while 75 of the negative standard samples yielded doubtful or partial reactions in the rapid method. Of the 4203 that were negative to the standard test 4113 also gave negative reactions to the rapid method. In the group of positive and doubtful reactions in which 1499 samples were classed by the standard tube method, 1410 of the same samples proved positive or doubtful to the rapid test. Of the doubtful samples alone, only 205 were so classified by the rapid method, while 372 were recognized as doubtful by the standard method. Stated in another way, 89 samples of sera that were doubtful in the standard test were recognized as distinctly positive in the rapid test. Thus fewer doubtfuls were recognized by the rapid test than by the standard method. Since doubtful or partial reactions from the standpoint of the control of Brucella infections in cattle should probably be thrown with the positive group, the apparent discrepancy becomes almost negligible from the standpoint of the eradication of the disease.

SUMMARY

1. A comparison of the results of the standard tube macroscopic agglutination test and Huddleson's rapid method, on 6166 samples of blood sera and milk sera, show insignificant variations. On 5702 samples of bovine sera tested in parallel, the index of agreement was .9362, or a negligible variation of .064.

2. The sensitivity of the rapid antigen suggests the advisability of frequent checking with the standard tube macroscopic test,

especially in partial or doubtful reactions. Obviously the rapid method is advantageous in dispatching a diagnosis by the agglutination test, and may be employed, according to our results, in routine diagnostic work without sacrificing accuracy.

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Another House Organ Steps Out

Number one of *The Allied Veterinarian* has made its appearance and joined the family of house organs circulated among veterinarians. The new publication is the product of Allied Laboratories, Inc., and bears a date-line of April, 1930. Dr. Mart R. Steffen (Chi. '04) is the editor. The sixteen pages contain much of interest to the veterinarian, particularly the man in general practice. If you have not received your copy, address a request to P. O. Box 1656, Indianapolis, Ind.

ALONG THE PANAMA PACIFIC LINE
On the Cathedral Square, Havana, Cuba

FRACTURES IN SMALL ANIMALS*

By WILLIAM E. RUGGLES, *Portland, Ore.*

This branch of surgery is of greater importance to the small-animal practitioner of today than it was several years ago, because of the fact that there is a higher percentage of his cases that are fractures than at any other time. This is due to two factors: first, the automobile; and second, people taking better care of their pets. They know that a competent veterinarian will put on a cast and obtain as good results as are secured in human surgery.

Our records show that 3 per cent of our cases are fractures and that 90 per cent of the fractures occurring in the extremities of dogs are in the hind legs of the male, such cases being the most difficult to handle. Of course, there are more male dogs than females, but the high percentage is due to the fact that males are more reckless and do not heed the approach of an automobile, especially, if he sees another dog across the street.

This paper will deal with the handling of fractures in dogs, mainly, but the principles of casts employed and the after-care apply the same to cats, silver foxes, or any other small animal.

Fractures of the extremities are the most common, the femur of the hind leg and the radius and ulna of the front leg being the bones more often affected.

The causes of fractures are many, but very often the cause is a deciding factor in the outcome of the case. The most common causes of fractures are automobile accidents, then follow kicks and falls, other types of traumatism, such as bites, gun-shot wounds, falls on hard surfaces, and other accidents. Predisposing causes are rachitis, undernourishment, necrosis and old age. These factors are of great importance also in reference to the length of time necessary for a strong union of the broken bones. The type of fracture has much bearing on the procedure to follow and the ultimate outcome of the case.

Fractures may be divided into three main classes: simple, compound and comminuted. Simple fractures may be transverse, oblique or partial. A partial fracture, usually occurring in the long bones of young animals, is called a green-stick fracture. The periosteum is unbroken but if no care is given, the bone may become completely fractured. Compound fractures occur quite

*Presented before the Willamette Valley Veterinary Medical Association, December 11, 1929.

often in the femur. A wound, either from the injury or from the broken ends cutting through the skin, leaves the bone exposed. The bone is shattered in a comminuted fracture and it may also be compound. This type of fracture is indeed difficult to handle, necessitating a great amount of after-care, once the cast is applied. Bones of rachitic or young dogs are quite often fractured at the union of the epiphysis and diaphysis, because it is the weakest spot of the bone at that time.

The first essential in fractures is a correct diagnosis. If a joint, the spinal column or the head is involved, if there are dislocations, or any doubt about the case exists, then an x-ray should be insisted upon. If the owner does not consent, then you are relieved of blame for undesirable results, and provided an x-ray would have made it possible to diagnose and care for the case correctly.

The guiding symptoms are local swelling and pain, loss of function, crepitation and unnatural physical outlines. A very thorough examination of the patient should be made, although the fracture is easily distinguished. Should there be a dislocation, a great amount of pain is usually in evidence. If the break should involve the scapula, then radial paralysis should be guarded against.

Treatment of Shock

As a result of automobile accidents and other types of traumatism, there may be internal hemorrhage, or the patient may be so shocked that stimulants and surgical pituitrin should be administered until such time as the animal has recovered to the extent that an anesthetic may be given. Save the patient's life, then set the bone.

Treatment of fractures entails these principles: Obtain apposition of the broken bones and maintain it by light, strong casts or other such means as is indicated in the type of fracture, for a sufficient time until the callus can form and thus permit the normal function of the part. The provisional callus forms quickly between the broken bones and usually causes some enlargement. If there has been good apposition the provisional callus is absorbed and the permanent callus can hardly be detected.

A cast should not be applied to any leg where the swelling is very intense. Complete rest, light supporting bandages on the entire limb, or cold applications will reduce the inflammation in a short time to such a degree that the bones may be properly

manipulated into position and held there by a firm cast, which would otherwise be loose if applied when the swelling is very marked and receding in a few days.

The inflammatory process occurring at a break in the bone where tissue is damaged is beneficial in that it brings more reparative substances to form the temporary callus or the uniting material of the broken bones.

Reduction of a fracture is not always of an easy nature unless, by the use of sedatives such as H-M-C, morphin sulphate, neonal or ether, the tension of the muscles is relieved and an opportunity is afforded to grasp the broken ends and manipulate them into direct apposition.

Materials Used for Casts and Splints

The supporting materials used in setting fractures are greatly varied. Ease of application, cost, weight and effectiveness are the desirable requirements of the material to be used. Plaster of Paris is too heavy, hard to change, and involves more work to apply. It has the advantage of setting quickly. Sodium silicate bandages are light but take too long to dry and harden, and are more difficult to adjust when loose. Mesh wire, leather, metal and other materials are used but are not very desirable in most respects. Resin and beeswax, equal parts, applied warm to splints and gauze, make a desirable cast substance. It is light and hardens quickly. We have found glue and yucca splint-board the most desirable, as it meets all the requirements of good cast material.

In fractures of the extremities, the patient is restrained with the affected member uppermost. The hair in long-haired breeds is clipped from the leg where the cast is to be put on, the toe-nails are trimmed, wounds properly cleaned and disinfected, and the dewclaw padded with cotton. The leg should be dry and clean. The limb, taking the hind leg for example, because it is most commonly affected and is more difficult to handle, is then grasped in the following manner. The left hand is applied near the body to steady and push, the right hand grasping the leg in the most advantageous position to obtain leverage and apposition. By pulling with the right hand and slightly twisting back and forth, the ends are easily brought into the desired position. After this has been accomplished, proceed to prepare the splint and bandaging material.

Yucca board (4 in. by 12 or 18 in. by $\frac{3}{16}$ in. and 6 in. by 30 in. by $\frac{3}{16}$ in.) makes a very satisfactory splint. It is light, easily shaped and strong enough for most any breed of dog. Place a board beneath the leg and trace with a pencil the outline in which the leg should be set. It should be cut one inch short, near the body, to permit the application of padding on the end of the stick. Then trace the outline of the upper part of the leg, leaving an inch or so protruding over the hip. The opposite member may be used for tracing on the board if done before the dog is restrained. The leg is then painted with glue of satisfactory consistency and is also applied to the board on the side next to the leg. This does not take the hair off when the cast is removed if warm water is used.

Cotton is then applied to the boards. The cotton should be of sufficient thickness to pad the joints properly and at any points where pressure of the cast takes place. Gauze is wrapped around the entire length of the leg, taken over the back for support, and then covered with glue to the point of the hip of the opposite leg. The splints are put on and, with the help of an assistant, the bones are replaced and held in apposition. With the assistant exerting pressure against the bandaging twist, the leg and cast material are kept in the desired positions. The bandage should be applied with neatness and firmness, and with an aim to make the cast comfortable for the animal.

Male Dogs Call for Special Treatment

In the male the penis must not be crossed in a manner that irritation and cutting will result. Also the bandage should not come far enough back on the sacrum to hinder defecation. The foot is protected by applying adhesive plaster for 3 or 4 inches on the cast, the remaining covering layer of gauze being stitched to keep it in place. If wounds are to be treated, suitable marks should be made on the outside to determine their location when dressing them.

The animal can be released in 12 to 18 hours, having given it time to recover from the narcotics used and sufficient time will then have elapsed for the cast to become hardened, when it should be tested as to fitting and toleration by the animal.

If the dog does not tolerate the cast, shown by digging or completely tearing it off, then aloes or any bitter may be applied, or even a muzzle may be necessary. This cast is opened every week for three or four times. This is best accomplished by

cutting the bandage on the anterior side of the leg down to the skin and examining the toes and places where most pressure occurs, to see that the circulation is not interfered with or that there is no moist eczema present. If such occurs, powder should be applied to the parts and covered with a small amount of cotton. The opening is then stitched together and covered or wrapped with gauze.

The after-care is very important and the following should not escape attention. If the health of the animal is impaired, as shown by pain, anorexia, inability to move about (in this type of fracture), temperature or swelling, then the causative factor must be taken care of. Often the cast must be adjusted and sometimes removed and a new one put on.

Wounds are treated by opening the window, cleaning up the area, and using ether on deep wounds and scarlet oil on skin wounds, after all infection is destroyed. Ether is penetrating and leaves no residue to be held by the bandage. It is therefore a very desirable agent for wound treatment.

Inability to move about normally results in improper elimination. A laxative is always indicated. In the male, urine often soils or damages the splint material, causing it to lose its function and creating a bad odor.

Other Details Receive Attention

Young animals that have not had distemper or been vaccinated should be given 10 to 15 cc of homologous anti-canine distemper serum, especially if the broken bone has resulted from an automobile accident or if there has been any exposure to cold or wet after the break. X-ray pictures should be taken if the case is not progressing satisfactorily. Cod-liver oil and lime water should be prescribed for rickety or undernourished cases.

Fractures affecting other parts of the body, aside from the extremities, are as a rule of a more serious nature, except when both legs are fractured on the same side. In these cases the limbs are set and if internal injuries are not too severe and the disposition of the patient is such that it will attempt to move about, then the outcome is more hopeful.

When the jaw is fractured, surgical interference is usually necessary. This is accomplished by the use of silver wire or screws. Another method is to bandage the head and jaws firmly, eliminating all movement and feeding liquid foods until union is secured.

Cranial fractures are rare but are usually comminuted. If the brain has not been damaged, the bone segments may be removed and complete recovery is reported. The degree of injury with subsequent infection is the deciding factor in the outcome of this type of fracture.

A fracture of the vertebral column, with impingement of the cord, is a difficult situation to handle, except fractures of the coccygeal vertebrae, which may be removed by amputation above the affected part or a light cast may be applied if there is no infection.

Injuries to the cervical, thoracic, lumbar or sacral regions, resulting in complete or partial paralysis, should always be x-rayed and prognoses guarded as to a successful termination, after any method of treatment. Where only the spinous processes are involved, these can be removed and the patient will experience no inconvenience from their loss.

Fractures of the cervical vertebrae with cord involvement are usually fatal. Lumbar vertebrae are not so commonly affected, because the ribs receive the shock of the injury. It is quite common in spinal fractures resulting from automobile accidents to find the articulation of the last thoracic and first lumbar vertebrae to be the one involved. The prognosis should be very guarded.

Paralysis May Follow Fracture

When the lumbar or sacral portion of the vertebrae is affected, the patient usually shows paralysis of the rear limbs, bladder and rectum. The treatment is to effect elimination, enforce complete rest for two weeks, and if after such time the patient shows no improvement, then it is reasonable to believe that too much hemorrhage into the canal or damage to the cord has taken place to insure any success to subsequent treatments. Casts or carriages, to immobilize the spine, with the above type of fractures, have their use, depending upon the disposition of the animal and the condition of the fracture. These appliances create a favorable sentimental feeling on the part of the client, for he then realizes that extended efforts are being made to restore the health of his pet.

Rib fractures, in which no serious damage has been done to the pleura, heal nicely from the application of tight bandages and enforced rest for two weeks. The sternum is so rarely fractured

that its consideration is of little consequence, as is true also of the hyoid and penial bones.

Fractures of any part of the pelvis are serious because the symphysis is very often the part involved. Rectal and vaginal palpation is of great value in determining the exact location of the trouble. Surgical interference can only be attempted in fractures of the symphysis, where suturing with silver wire is the method used. Complete rest for four to six weeks is necessary for fractures of the pelvis.

The owner should be informed of the risk taken in breeding a female that has sustained a pelvic fracture. If this is done a lot of embarrassment may be prevented when a cesarean has to be resorted to in delivering the pups from the bitch in which you were so elated in securing union of a fractured pelvis.

Some veterinarians condemn too many fractures and are sorry later when some other fellow succeeds in making the leg sound again. Others never set a leg but want nature to do it all, which is surely not surgery and does not conform to the wishes or expectations of their clients.

Bone suturing, because of its difficulty, relative infrequency and cost, is not attempted when the occasion demands, so that many animals are condemned as a result of the veterinarian's limited practice in this line of beneficial and lucrative service.

Points to be remembered in reference to other small animals are: Silver foxes must be kept separate in a small dry enclosure and means taken, if the need arises, to prevent chewing of the cast, which is unusual if confined in a small place. Do not clip the fur when it is prime, for should the animal die from any cause the pelt would be almost worthless. Cats are given amytal one hour before the time to apply the cast and ether is used to further anesthesia. One must be very certain that casts on cats are applied firmly, for they often draw up the leg after the cotton and bandage are applied and before the splints are put in place.

Successful bone surgery is a decided asset to the small-animal practitioner and a neat, well-applied cast is one of our best walking advertisements.

World's Poultry Congress

The Fourth World's Poultry Congress will convene in London, England, July 22-30, 1930. Dr. W. T. Johnson, of Corvallis, Oregon, will act as official delegate of the A. V. M. A.

TRANSMISSION OF BACTERIUM PULLORUM INFECTION AMONG MATURE CHICKENS

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In an article appearing in the *Cornell Veterinarian*[1] a preliminary report has been made on this phase of the pullorum disease problem. Using a pen of infected and non-infected females, the infection was found not to spread until male birds were introduced. In another pen composed of non-infected females and reacting males, no evidence of transmission of the infection was obtained.

The information obtained from this preliminary work, using naturally infected fowls, illustrates the possibilities of the spread of the disease among mature chickens. The experiment was not conducted on a sufficiently large scale to warrant definite conclusions which would apply to all flocks. The experiment, however, did illustrate certain phases of this disease.

Since the publication of the first observation, Edwards and Hull[2] have reported upon a similar experiment. They kept 73 reacting hens with 15 non-reactors. One of the original non-reactors gave a positive agglutination test at the third month, one during the seventh month, two during the eighth month and one during the tenth month of the experiment. All of these reactors were found to be infected upon autospy.

GENERAL PLAN OF EXPERIMENTS

Four pens, composed one-half of reactors to the agglutination test and one-half non-reactors, were assembled. In two of these pens, males were placed and two were observed without males. It was unfortunate that an outbreak of fowl-pox occurred in all the pens and the mortality was so large in two of them that they are omitted from this report. The two pens recorded were made up of yearling Single Comb White Leghorns.

All birds were tested, the agglutination test being used for the detection of any spread of the infection. At the end of nine months the entire group was sacrificed and examined for evidence of infection.

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A single strain of *Bacterium pullorum* was used for preparation of the antigen. Dilutions were from 1-10 to beyond the titre limit. The antigen was prepared fresh each time and preserved with 0.5 per cent phenol.

Source of Chickens Used in Experiments

All reacting chickens were obtained from flocks which were being tested under a pullorum disease control program. The birds were originally detected in the flock by using a serum dilution of 1-40.

The non-reacting birds were obtained from pens at the local Department of Poultry Husbandry. The birds in this group of 125 were more or less isolated during one year previous to this work. A preliminary test revealed the group to be free from reactors. It is believed that the source of non-infected stock was satisfactory.

Experiment I

This pen was composed of yearlings with males. They were housed in a 10 x 12 Cornell type brooder-house with a small yard attached. During the winter and spring months the birds were confined to the house, which should have assisted the dissemination of the disease.

Twenty-seven birds survived the experiment and inasmuch as those that died during the experiment would furnish an incomplete record, they have been omitted.

The pen was assembled January, 1928, and the experiment completed during October of the same year, making a period of nine months. During that time, five agglutination tests were applied to the birds.

The thirteen original reactors gave consistent tests. At the time of autopsy seven birds of this group revealed gross evidence of pullorum infection and the organism was isolated in each case. Two of the birds did not reveal gross lesions and cultures were negative. In these two cases it is suspected that recovery took place, as the serum titres gradually became negative. Four birds showed questionable lesions which were not cleared by culture information. One of these revealed pericardial adhesions. The three others revealed a single cystic ovum attached to the ovary but which did not have the typical appearance of pullorum infection.

The original non-infected group remained so throughout the experiment. The agglutination tests were likewise negative

throughout. The two males remained negative to both the tests and autopsy.

In this one pen with males, there was no dissemination of the infection detected during a nine-month period.

Experiment II

This pen was composed of yearlings and handled at the same time and in the same manner as the pen in experiment I. The only difference was that no male birds were used. Fourteen original reactors survived. Nine of the fourteen showed gross lesions and yielded positive cultures upon autopsy. The five others showed questionable lesions and failed to yield cultures of *Bact. pullorum*. The questionable lesions consisted of apparently old pullorum-infected ova, some still attached to the ovary and others in the peritoneal cavity. The nature of the lesions in this questionable group suggests an infection which had subsided.

The original non-reactors consisted of fourteen birds. At autopsy thirteen did not reveal any evidence of infection. One bird showed ovarian infection from which positive cultures were obtained. This individual gave a positive agglutination reaction during the fourth month. One other individual also reacted during the same month, but autopsy did not reveal any evidence of infection. All other agglutination tests of this group were negative.

Summary

In one pen of thirteen reacting birds and twelve non-reacting birds with two non-reacting males, no evidence of transmission of the infection was obtained. The pen was kept intact for a period of nine months.

In another pen consisting of fourteen reactors and fourteen non-reactors without males, the infection was found to have spread to one bird. The method of dissemination was not determined.

Although in a previous experiment the infection did not spread until male birds were introduced, there was no evidence that the male bird is necessary for dissemination. There is no doubt that the infection spreads between mature stock, but the rapidity is not as is generally believed. These experiments and others show that the virus spreads rather slowly and then not to so great an extent as we are led to believe.

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ANIMAL DISEASES—A MENACE TO THE HUMAN FAMILY*

By JOHN R. MOHLER

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In instituting any measures for the control of animal diseases, those most intimately concerned in formulating the program are brought to a consideration of two prime factors involved; one purely economic, the other pertaining to public health. With certain of our animal plagues, and chief among them some of the most dreaded, as for example hog cholera and rinderpest, the incentive for their suppression is almost solely dependent upon the pecuniary savings involved. But there are many other scourges quite as important to the animal husbandry of our country which are also communicable from animal to man and here the control problem has both the economic as well as the human health aspects. In dealing with these affections the veterinarian is in a position, through his special training, to lend his medical confrere a helping hand not only by actually reducing or eliminating entirely sources of infection but also through cooperating, in cases of obscure clinical picture, where there may be a possibility of tracing the infection to animal origin.

The efficient research worker in human medicine must be prepared to carry his investigations, if necessary, into the cow-stable, hog-pen, or hen-house. Similarly investigators of such animal diseases as tuberculosis, milk sickness, rabies, and abortion disease find that the owners of affected animals are often most concerned about the human health phase of these maladies.

TUBERCULOSIS

The success of the present extensive campaign to eradicate tuberculosis from domestic live stock is due largely to interest among stock-owners in the danger of the disease to their families and purchasers of their products, especially raw milk. The work of inspectors who test cattle results in many comments by stock-owners, often of the most touching and pathetic kind, when dis-

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eased cattle are detected and when tuberculosis is also found to exist among members of the cattle-owner's immediate family.

Since systematic tuberculosis eradication from live stock began in 1917, the cooperative federal, state and county forces have detected and removed from herds more than one and one-half millions of cattle that reacted to the tuberculin test. Success in freeing individual herds from tuberculous cattle has gradually extended to the broader work of eradicating the disease from communities, counties and states. There are 3,072 counties in the United States, and over forty per cent of them now have engaged in some form of area tuberculosis eradication and 833 of those at this time are modified accredited areas, i. e., have less than 0.5 per cent infection.

In this connection the Department of Agriculture has prepared several motion pictures dealing, in story form, with the suppression of tuberculosis. One of these pictures, "Clean Herds and Clean Hearts," which deals with eradicating the disease from country-wide areas, shows the very close relation between the problems of city and farm, human and animal health, economics and science, and local politics and family life. Another has to do with various phases of avian and porcine tuberculosis control. The films mentioned are lent to responsible persons and organizations in the interest of tuberculosis eradication work.

Foot-and-Mouth-Disease

During the last few years the press of the country devoted considerable attention to outbreaks of foot-and-mouth disease that occurred in California and Texas in 1924. This is primarily a live stock malady, affecting cattle, swine, sheep and goats. Some wild animals, especially deer, also are susceptible. Foot-and-mouth disease is a serious live stock scourge in most countries of the world, causing lesions of the feet, mouth and udder, which interfere seriously with meat and milk production, and result in many deaths among young animals.

Foot-and-mouth disease, though transmissible to human beings, especially through consumption of raw milk, is extremely mild in its effect on persons and of negligible importance as a human disease. From a medical standpoint, however, the outstanding research of many foreign scientists is worthy of brief description, since the results have led to important facts concerning filtrable viruses.

Since the seventeenth century, eminent investigators of England, France, Germany, Austria, Italy, and other countries have studied foot-and-mouth disease in the hope of perfecting a serum or other preventive agent. Scientists who have studied this highly infectious disease include such authorities as Loeffler, Frosch, Uhlenhuth, Kitt, Waldmann, Ernst, Nocard, Roux, Leclainche, Vallée, Carré, Perroncito, Bang, and many others.

It is interesting to note also that two-thirds of these research men were veterinarians. Investigations of foot-and-mouth disease by the Berlin Institute for Infectious Diseases and the German Imperial Health Office first furnished definite experimental evidence, later confirmed by workers in the Pasteur Institute, that a disease could be caused by a filtrable, ultramicroscopic virus. This evidence later led to the determination of similar filtrable viruses as the causes of yellow fever, measles, infantile paralysis, chicken pox, and other diseases of human beings.

Insect-Borne Diseases

One of the most promising fields for research in both human and veterinary medicine is that of transmission of disease by insects or similar parasites. Well prepared and well trained zoologists and entomologists are in increasing demand. The manner, thus far unexplained, in which certain diseases spread, casts suspicion on parasites as the conveyors of infection. It is less than thirty years, a comparatively short period in medical science, that the manner in which certain mosquitoes spread yellow fever to man has been known. This knowledge is based on the researches of Drs. Smith and Kilbourne, under the direction of Dr. D. E. Salmon, first chief of the Bureau of Animal Industry. That work furnished the first experimental proof that certain infectious diseases can be carried from animal to animal only through certain insects acting as intermediate hosts.

Milk Sickness

Certain diseases, though related, have different names in veterinary and human medicine. For instance "trembles" in cattle and milk sickness of persons have been a subject of scientific investigation for many years. In pioneer days milk sickness was virtually a pestilence which terrified entire communities. One outbreak of milk sickness, a few years ago, is reported to have caused the death of fifteen persons within a short time, and this outbreak is but a repetition of many others in the past.

For years milk sickness was a mysterious disease until traced to the milk and butter of cows that had eaten poisonous plants.

In the East and Central West the poisonous plant is the richweed, also known as white snake root. In Texas and New Mexico a poisonous plant known as the rayless goldenrod likewise causes milk sickness, though the malady is more commonly known in that region as alkali disease.

Investigations made in the laboratories of the Bureau of Animal Industry have resulted in the isolation from richweed of the poison that causes trembles.[1] This poison, which is a complex alcohol known as "trematol," has been purified and studied extensively to determine its chemical properties and effects on animals. The discovery of this substance has finally solved the century-old mystery of milk sickness. The poison of the rayless goldenrod, though not studied so completely, is known to be dangerous when the plant is either green or dry.

Even when milk sickness is not fatal to man, there generally follows a long period of illness and reduced vitality. The poisonous plants mentioned are especially dangerous during the fall months and animals should be kept out of pastures known to be infested with them. Pulling or digging up the plants is advised for combating the disease so injurious to both animals and man.

Dermatoses

In the whole field of human medicine, dermatology, perhaps, is beset with the most interesting and perplexing problems particularly as regards diagnosis. The skin specialist, working for the most part with affections more or less strictly confined to the human family, at times encounters lesions which are unusual and new to him. In some of these cases, by combining careful clinical and laboratory study, he may find a parasitic disease common to animals and well known to the veterinarian. There is a fairly long list of dermatoses communicable from animal to man, and here, as an example, we may allude to canine ringworm. During the past year, in the laboratory of Dr. C. H. Wollridge, in England, several of his assistants who were charged with the care and treatment of some dogs suffering from ringworm became infected on their hands and arms. Marked and typical lesions developed and Dr. A. Whitfield, a physician, made a study of the affection and isolated the causative fungus, *Microsporum canis*, in pure culture from his human patients.

Undulant Fever

More than thirty years ago, Bruce discovered the causative organism of Malta fever, later called undulant fever of man. This infectious agent, now designated *Brucella melitensis*, is conveyed to man through the milk of infected goats in which animal it at times causes abortion without other marked general symptoms. In 1918, Evans called attention to certain striking points of similarity between, if not the practical identity of, *Brucella melitensis* and *Brucella abortus*, the etiologic agent of bovine contagious abortion. In the years that followed, suspicion was cast on the latter organism as a new pathogenic agent for man and more recently this suspicion has been definitely confirmed, so that now we know the abortion germ is capable of causing undulant fever in man. *Brucella abortus* includes two types, porcine and bovine. The former type causes abortion in sows and sometimes affects the genital organs of boars. The latter type induces abortion in cows and occasionally causes disease of the genital organs of bulls. Neither of these organisms, as a rule, causes other symptoms in swine or cattle but they do in a large proportion of the cases invade the udder and are eliminated in the milk for long periods. While both types may at times infect man the porcine organism seems to be more infectious than the bovine type. *Brucella melitensis* appears to be more virulent for man than either of the abortus types.

While strong circumstantial evidence points to raw milk from infected cattle as a vehicle of infection in some undulant fever cases reported, it is known that very many people, especially in rural districts and small towns, where pasteurization is not the rule, have been drinking raw milk for years with surprisingly few cases of the disease being reported in such persons. It therefore seems highly probable that unless milk is infected with an unusually virulent strain of *Brucella abortus*, it is relatively harmless for man. However, it is possible that milk containing an exceedingly large number of organisms, even though of the usual type, such as from a single cow whose udder is grossly infected, may cause the disease especially in highly susceptible persons. More frequent infection of man by *Brucella abortus* is believed to result from contagion during the caring for and treating of infected cattle or hogs or in dressing their carcasses. In this connection, we may mention that studies of the disease indicate that infection occurs four times more frequently in men than in women and rarely in children.

Infectious abortion is so widespread and the milk of so many animals is infected that the main dependence for protection of the human family against whatever danger there may be from *Brucella abortus* in milk must be placed in pasteurization, which, if properly done, will make this food safe until such time as the infection can be eradicated from the herds.

Anthrax

Anthrax represents a type of infection transmitted to man solely from animals or their products. The complete eradication of anthrax infection in live stock would thus close the source of infection to man and at once relieve mankind from the ravages of another malignant disease. In the treatment of human anthrax marked success has attended the use of serum prepared by hyperimmunizing the horse, but in animals, once the infection is sufficiently well established to make a diagnosis possible, this serum is of little value. As an illustration of the importance of anthrax as an ailment we may cite a report from insurance officials which indicates that during a 20-year period, 648 laborers in the leather industry in Germany acquired anthrax and 98 died from the infection.

Actinomycosis

Actinomycosis is a common disease of cattle and occurs less frequently in other domestic animals and man. While this disease appears most frequently in the region of the head and neck, it may occur in various organs of the body.

Case reports which appear in medical literature indicate that animal and human tissues are equally susceptible to infection. The greater prevalence of the disease in animals, especially cattle, is no doubt due to the nature of their food as the normal habitat of the causative agent, the ray fungus, is inside the husks and sheaths of barley and grasses. This fungus is readily conveyed to the tissues, especially of the tongue and around the teeth, where it gives rise to the characteristic lesions.

While it has been claimed by prominent scientists that it is not possible to produce positive results in the transmission of the disease from man to animals through inoculation, the conflicting hypotheses of Bostroem on the one hand and Wolff and Israel on the other, with regard to the life history of the ray fungus, have aroused new interest in the subject of mycelial diseases which has lead to a controversy not yet settled. In the meantime we do

know that there is a common source of infection for both man and animals.

In speaking of actinomycosis, Dr. A. H. Sanford, of the Mayo Clinic, Rochester, Minnesota, said in 1921:

> I believe that it is also true that the occurrence of actinomycosis in man depends somewhat on the locality in which he lives, as one might naturally suppose. I have been astounded during the past ten years, at the number of cases we see of this pathological condition.

Glanders

In spite of the marvelous advancements achieved in modern therapeutics, there still remain certain maladies for which neither specific medication nor adequate palliative treatment has been discovered. Unfortunately there are numbered among these diseases some of the most horrible of all affections which attack both animals and man. We may choose as infections of this kind rabies and glanders, though perhaps in the light of the splendid work of Drs. Torrance and Watson, two Canadian veterinarians, we now may have hope of success in treating the latter-mentioned disease. These investigators produced a hyperimmune serum by repeatedly injecting a horse with mallein, and with this serum their medical colleagues obtained very promising results in treating the disease in man. One of the patients responding to the serum treatment was a farmer who had contracted the infection from one of his horses and had suffered for a year with very extensive lesions of the right leg. Surgical and general treatment was quite unavailing and the condition became so grave that amputation above the knee was seriously considered. Shortly after beginning the serum treatment, marked improvement was noted and within a month's time the lesions had healed. A doctor in attendance on this case became infected through a scratch on the right forefinger. An ulcer about ¾ by 1½ inches developed on the dorsal surface of the proximal phalanx and discharged copiously. Under serum treatment healing occurred within two weeks. In both of these cases *B. mallei* was isolated from the lesions, proving beyond any question the identity of the disease.

Through the activities of the veterinary sanitarians of our state and federal governments the incidence of glanders in horses and mules has been so reduced that at present this has become one of the rare diseases. A large part of the credit for suppressing this infection is due to early and correct diagnosis made possible by the application of the mallein test in the field and the various

serological tests in the laboratory. Thus the clinician and laboratorian have been able to cooperate in checking each others work.

Rabies

Rabies, an even more dreadful disease than glanders, is primarily an animal malady and in the vast majority of cases is transmitted to man by the bite of a rabid dog. The virus is present in the saliva of the infected animal even before the creature manifests any symptoms of illness and experimentally it has been shown that this infectious state may cover a period of from eight to fourteen days. With this fact in mind, all biting dogs should not be destroyed forthwith but should be held under observation for at least a fortnight to make certain the presence or absence of rabies infection.

During the past decade there has been quite a decided increase in rabies in dogs in the United States and in some localities its prevalence has reached alarming proportions. In 1928, there were 7,813 persons bitten by suspected rabid dogs and six deaths occurred in humans from rabies. Dr. H. C. Becker's recent report[2] shows that in Chicago alone 917 positive cases of canine rabies were diagnosed last year. The attention of the practicing physician and the public health officers has thus been forcibly called to the great menace to man caused by this animal plague. Moreover the absolute and urgent need for closest cooperation of the medical and veterinary professions is here again vividly illustrated. The burden of carrying out control measures must rest on the shoulders of both.

Pasteur vaccination, which stands as one of the enduring monuments to that great man, has greatly reduced the mortality from rabies and is without doubt one of the greatest blessings bestowed on mankind by medical science. It cannot, however, be considered the solution of the problem, for notwithstanding its successes, it is not infallible, is expensive, requires much loss of time during treatment, and does not altogether relieve the great mental anxiety of the patient until time has assured the success of the treatment. The success of the treatment depends on its employment as soon after exposure as possible so that an immunity can be produced to counteract the development of the disease which usually takes several weeks. Rabies is one of the few diseases that is invariably fatal and once symptoms develop there is no hope. Stamping out the disease completely is thus the goal toward which we should strive.

In theory the eradication of rabies and maintaining the country free from this infection seems simple and, indeed, in both England and Denmark, through the application of the principles of rabies control, the disease has been entirely suppressed. Eradication measures include vaccination, quarantine, muzzling, and destruction of stray dogs.

Trichinosis

One of the most unusual diseases transmitted from animals to man is trichinosis. As is well known, it is caused by consuming raw or partially cooked pork containing microscopic parasites called trichinae, from which the disease takes its name. Trichinae cause no visible symptoms whatever in live hogs and even a microscopic examination of meat cannot be depended on to disclose their presence. Yet when a person consumes raw pork infested with the microscopic worms, the very painful, serious, and frequently fatal trichinosis is liable to occur. The disease occurs most commonly soon after hog-killing time in the fall and also during the Thanksgiving and Christmas holidays, when sausage and various meat delicacies containing raw pork are eaten freely.

The well-known preventive is to cook pork well. There is only slight danger from cured pork products, such as hams and bacon, especially when made under federal inspection. Considerable progress has recently been made in developing an intradermal test for the diagnosis of trichinosis in swine and it is proposed to try out this test on hogs under conditions prevailing in large abattoirs in the near future.

Other Diseases

Time will not permit the discussion of other animal diseases which menace the human family. However, mention should be made of infectious jaundice, tularemia, paratyphoid, rat-bite fever, bubonic and pneumonic plague, septic sore throat, swine erysipelas, cow pox, psittacosis, Rocky Mountain spotted fever, and measles of beef and pork.

In any discussion of animal and human health problems it is well to consider that the work which the veterinary profession and live stock sanitary authorities are doing to control and eradicate animal diseases is also a service to mankind in other ways than merely checking the menacing communicable diseases. The live stock industry supplies man not only with food, clothing, leather goods, and numerous other necessities but serves in scores

of other ways. It produces fertilizer to maintain the fruitfulness of our fields, gardens and orchards. It contributes numerous products and by-products for arts and industries. Certain glands of animals furnish many valuable preparations, such as pepsin, insulin and adrenalin, used in human medicine. Accordingly it is plain that the relation between animal diseases and public health not only is intimately close, but also that the study of live stock problems and sciences dealing with them contribute in a surprising degree to public health and welfare.

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Bulletin on Ox Warbles

Veterinarians are reminded that the Bureau of Entomology, U. S. Department of Agriculture, about four years ago, published Department Bulletin 1369-D, "The Cattle Grubs or Ox Warbles, Their Biologies and Suggestions for Control," which treats in detail of the studies and experiments dealing with this pest, conducted by the Bureau. A small stock of this bulletin is still available for distribution to those who desire somewhat fuller information than is provided in the more recent popular-style, Farmers' Bulletin 1596-F, "Cattle Grubs or Heel Flies with Suggestions for Their Control," which is also obtainable on application to the Office of Information, U. S. Department of Agriculture.

Annual losses to the live stock industry caused by this pest, estimated at from $50,000,000 to $100,000,000, make advisable vigorous steps for its eradication. Control on individual farms is usually advisable and profitable, but the campaign is likely to be much more effective and profitable is waged on a large scale, with eradication of the parasite from a considerable area. The entomologists anticipate that in the long run it will prove necessary to conduct eradication work by areas, somewhat after the methods of tick eradication in the South. The studies reported in this bulletin afford the facts on which local control campaigns may be projected. The authors point out the desirability of many large-scale demonstrations of grub eradication. Copies of Bulletin 1369-D may be obtained from the U. S. Department of Agriculture, Washington, D. C.

DURATION OF THE ELIMINATION OF BACTERIUM ABORTUS BANG IN THE VAGINAL AND UTERINE DISCHARGES OF INFECTED CATTLE*

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The successful control of an infectious disease depends in a large measure upon knowledge as to how the cause is distributed. Definite information concerning the channels of elimination of the virus of a disease constitutes a very important key in the eradication of the infection.

The successful control of bovine infectious abortion, or, as it is now called, Bang's disease, is dependent, to a large degree upon definite knowledge as to how the organism leaves the body, and the dangerous periods of infected individuals. It has been known for many years that *Bacterium abortus* Bang is eliminated with the discharges from the genital tract at the time of parturition or abortion, and through milk.

In 1897, Professor Bernard Bang[1] first described the organism. He learned that large numbers of the germs were excreted at the time of abortion in the discharges from the vagina and with the placenta itself.

Following the discovery of the germ in milk by Schroeder and Cotton,[2,3] in 1912, it has been shown that in some animals it may be continually eliminated in the milk during the entire lifetime of the individual. In other cases, the udder may shed the infection and the milk will become free. Reports differ as to the number of infected animals which eliminate the organism through their udder. Percentages vary from thirty to more than eighty per cent. The average would probably be between forty and fifty. We believe that this percentage probably represents the number of infected animals that eliminate the organism in the milk. The literature contains many references to work in this field.

It is su prising, however, how little published data there are in relation to the elimination of the organism from the vagina. It is, of course, a well demonstrated fact that the organism is

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eliminated from that organ, but the length of time that an infected animal is an active spreader from this source has not yet been definitely determined.

The first information that appears in the literature on this point is in the Report of the Departmental Committee appointed by the Board of Agriculture and Fisheries of Great Britain, to inquire into epizootic abortion.[4] They state:

> The discharge which comes from the genital organs for a varying period after the act of abortion is virulent.

They refer to two experiments. The data on which they make this statement are based entirely on the examination of stained smear preparations made from the discharge of aborting cows, and the data given indicate that smears were made only two or three days following the abortion. In another section of this report, they state:

> It is interesting to note, in connection with this heifer that she was killed a month after aborting, and although a careful search for abortion bacilli was made in scrapings from the mucous membrane, none could be found. This observation militates against the view that abortion bacilli remain in the genital tract for a long time after abortion has occurred.

This report was presented in 1909.

In 1912, Moore and Fitch[5] report that in their studies one cow was slaughtered sixty days after abortion and carefully examined. The Bang organism was procured in cultures from the contents of the uterus.

In most of these cases, the studies have been made upon material obtained at autopsy. Few examinations have been made on material taken directly from the vagina.

Cotton,[6] in 1913, reported that repeated tests of vaginal scrapings from an animal which had recently aborted, proved that the bacillus was eliminated through this channel up to and including the thirteenth day following abortion. Subsequent tests were negative.

In an article presented by Schroeder and Cotton,[7] in 1917, it is stated that, when abortion bacilli are injected into the non-pregnant uterus of a cow, they disappear in the course of a few days. When the discharge from the uterus of a cow which has aborted is tested, abortion bacilli may be found from twenty, thirty and even up to forty or fifty days, but they eventually disappear and it is the impression of these investigators that their abundance and period of persistence is intimately related to the magnitude of the lesions of the uterus attendant upon an abor-

tion. This seems to be the prevalent opinion at that time. The data upon which this opinion is based are, however, very meagre.

Two years later, Cotton[8] makes the statement that the maximum length of time that Schroeder and he had found the organism in the uterus, after abortion, was fifty-one days, which was based upon observation made on material secured at autopsy.

The same year, Schroeder,[9] when discussing studies relative to the occurrence of abortion bacilli in the non-pregnant uterus, stated:

> The infected condition lasts from a few days to a few weeks. As a common rule, tests to discover abortion bacilli in the uterus three weeks after an abortion or a parturition, give negative results, though we have had one case on record in which they persisted nearly two months. The latter must be looked upon as a rare exception.

Hallman,[10] in the same year, presenting a discussion of sequelae of abortion bacilli infection in the bovine uterus, states that in the examination of ten cases of bovine cervicitis and endometritis, in not a single instance was the Bang organism found in the uterus. The definite time following the act of abortion or parturition is not stated in his article.

Stafseth,[11] in another publication, gives the technic of examinations of these cases. Animal inoculations, as well as cultural

TABLE I—*Typical series. Cow E 81. Calved at 270 days, on December 5, 1928. Agglutination titre: > 1000*

SPECIMEN	TIME FOLLOWING ABORTION OR PARTURITION	RESULTS OF CULTURES FOR BACTERIUM ABORTUS	RESULTS OF CAVIAE INOCULATIONS FOR BACTERIUM ABORTUS
1	(Placenta and Fetus)	—	Placenta +; Fetus —
2	1 day	—	+
3	3 days	—	+
4	5 days	—	+
5	10 days	None made	+
6	15 days	None made	+
7	22 days	None made	—
8	31 days	None made	—
9	34 days	None made	—
10	42 days	None made	—
11	55 days	None made	—
12	70 days	None made	—
	Aborted at 163 days, on June 15, 1929		
1	(Fetus)	+	+
2	4 days	+	+
3	9 days	None made	+
4	14 days	None made	—
5	18 days	None made	—
6	23 days	None made	—
7	31 days	None made	—
8	38 days	None made	—

methods, were used in the examination of the autopsy specimens. He confirms the statement of Hallman that "*Bacterium abortus* was not isolated from any of the organs. Staphylococci, streptococci, and other organisms were occasionally found."

Giltner and Bandeen[12] state that they have failed to isolate the abortion bacillus, when introduced into the vagina or sheath, generally after twenty-four hours. This, of course, refers to artificial infection. In a detailed account of their cases, they show that they were able to recover *Bact. abortus* from one animal,

TABLE II—*Typical series. Cow 62. Aborted at 175 days, on November 23, 1928. Agglutination titre: > 1000*

NUMBER	DAYS FOLLOWING ABORTION OR PARTURITION	RESULTS OF CULTURES FOR BACTERIUM ABORTUS	RESULTS OF CAVIAE INOCULATIONS FOR BACTERIUM ABORTUS
1	(Fetus)	+	None made
2	3 days	None made	+
3	7 days	+	+
4	12 days	—	+
5	14 days	—	—
6	18 days	—	—
7	23 days	None made	—
8	28 days	None made	—
9	35 days	None made	—
10	44 days	None made	—
11	47 days	None made	—
12	55 days	None made	—
13	68 days	None made	—
14	83 days	None made	—
15	90 days	None made	—
16	98 days	None made	—
Calved at 271 days, on November 13, 1929			
1	(Placenta)	None	—
2	5 days	+	—
3	8 days	—	+
4	12 days	—	—
5	16 days	—	—
6	22 days	None	—
7	31 days	None	—

TABLE III—*Summary*

Total number of specimens examined	284
Number of series of examinations from positive animals	24 (22 animals)
Number of series of examinations from suspicious animals	2 (1 animal)
Number of series of examinations from negative animals	9 (9 animals)
Longest period following abortion or parturition *Bact. abortus* was found in the discharges or secretions from the vagina and uterus	25 days
Shortest period	5 days
Average	12 days

fifteen days after abortion, and from another animal twenty-eight days after. The examinations were made at autopsy.

A careful study of these data indicates that conclusions as to the length of time during which animals disseminate the organism via the vagina, following the act of parturition or abortion, are based upon very meagre experimental evidence. It is possible that we have not found all the published investigations which have been carried out, but we have searched the literature, and have cited all that we have found.

In order that more data might be available upon which to base a statement as to how long an animal will disseminate the organism from her vagina, we undertook routine examinations of animals which have aborted or which have given birth to calves at full term, but were known or suspected of being infected with the germ.

We were able to obtain a number of aborting animals by placing a standing order at the South St. Paul stockyards, to purchase for us any animal which aborted in the yards with which they could also furnish the fetus. In this way, we have been able to obtain a considerable number of animals. The results of these examinations will be appended in tables.

The methods used consisted of securing the discharge in sterile glass containers, and using both cultures and animal inoculations to determine the presence of the germs. Guinea pigs have been inoculated with the material, usually interperitoneally, sometimes subcutaneously. Suitable culture media, including gentian violet, have been employed in connection with this study.

Discussion

The results of this study indicate that *Bacterium abortus* is not eliminated from the uterus of an aborting animal for a long period of time. This was suggested by the literature which has been cited. Three to four weeks seems to be ample time to allow the organism to disappear from the discharges emanating from the vagina. It should be kept in mind, of course, that the organism is rarely, if ever, resident in the vagina and that its presence in this organ is due to discharges from the uterus.

Another problem which suggests itself as a result of this study and which is not amenable to an easy solution is, how long a time before parturition or abortion is the organism eliminated through the vagina. There are very few data available on this subject. We expect to attack it.

It is of course realized that *Bacterium abortus* Bang has been found in the uterus on autopsy a longer period than it has been found in these studies. This, of course, is to be expected. It is undoubtedly present for a considerable period of time, probably three weeks or more, in the uterus, when its presence cannot be detected in the discharges from that organ.

We do not believe that this constitutes a serious danger in the spread of the virus. The Bang organisms eliminated after three to four weeks, following parturition or abortion, apparently are not viable, or are eliminated in such small numbers, that their presence cannot be detected by cultures or animal inoculations.

Conclusion

Bacterium abortus was eliminated by discharges from the uterus through the vagina for a maximum period of twenty-five days following parturition at full term or abortion.

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THE DEVELOPMENT OF AN EFFECTIVE PROPHYLACTIC FOR DOG DISTEMPER*

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As the delegated representative of the Committee on Canine Distemper of the American Veterinary Medical Association, the writer recently had the privilege of spending five weeks in England, reviewing in detail the investigations on the cause and prevention of dog distemper, conducted by Laidlaw and Dunkin, under the auspices of the Field Distemper Fund. Following five years of painstaking research, these investigators confirmed conclusively the previous view of Carré that the causative agent of dog distemper is a filtrable virus. They succeeded also in developing a practical means of immunizing dogs against the disease. Their achievements, while of primary importance to dog-owners and veterinarians, are of interest to every research worker in filtrable virus diseases of man as well as animals, since much of the knowledge acquired may well have a practical application in other diseases of this group.

This extensive investigation of dog distemper, covering a period of five years and not yet concluded, was made possible through the cooperation of the Field Distemper Council (organized by *The Field*, of London) and the Medical Research Council, which corresponds to our own Hygienic Laboratory in Washington.

The Field Distemper Council, headed by the Duke of Portland, K. G., sponsored the raising of funds from dog-owners in the United Kingdom, India, the United States and other parts of the world, to assist in defraying the expenses of the investigations. Funds in this country were collected and forwarded through the American Distemper Committee, headed by Mr. Hobart Ames, Chairman, and Mr. Chas. H. Tyler, Secretary, both of Boston.

Laboratory accommodations and other technical facilities were provided by the Medical Research Council at their Farm Laboratories at Mill Hill, some six miles from the outskirts of London.

As an advisory body there was organized the Field Distemper Research Committee, headed by Sir Charles Martin. The investigations about to be described were conducted for the Dis-

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temper Research Committee by Dr. P. P. Laidlaw, F. R. S., and Major G. W. Dunkin, M. R. C. V. S., both in the service of the Medical Research Council.

For the benefit of those not conversant with canine distemper, this disease has been known to exist for a great many years in all parts of the world and has been generally recognized as the most destructive scourge of dogs. As commonly encountered, it is manifested by a febrile condition, accompanied by discharges from the nose and eyes, inappetence, diarrhea and wasting. While at times it may cause only a transitory illness, in other cases it results in a serious and prolonged illness with high mortality. Broncho-pneumonia is a frequent complication, and in prolonged cases it is not unusual to have an involvement of the nervous system manifested by fits and often resulting in an incurable chorea.

The infectious nature of the disease was early recognized and attempts made to isolate the causative organism. The *Bacillus bronchisepticus*, isolated in 1911, independently by M'Gowan and Ferry, and, subsequently, by Torrey and Rahe, was for a long time regarded as the causative factor, since it could readily be isolated from dogs suffering with distemper. Also evidence was presented that this bacillus, when freshly isolated, was pathogenic for dogs. On the other hand, Carré, as early as 1905, claimed it was possible to transmit the disease by sterile filtrates of infective material, that is, he regarded a filtrable virus as the causative agent.

The investigations at Mill Hill were undertaken with the object of further clarifying the knowledge as to the causative agent, and with the ultimate aim of developing a means of rendering susceptible dogs immune.

Since much of the previous experimental work on distemper was clouded by the uncertainty of the susceptibility of the test animals, in beginning the project at Mill Hill the Field Distemper Research Committee, with foresight, arranged for the securing of known susceptible dogs for the investigations.

It was decided that the susceptibility of dogs for experimental use could be insured only by breeding them in quarantine quarters, removing the parent animals as soon as practical and doing everything possible to prevent the introduction of infection. Accordingly, a kennel compound, including living quarters for the attendants, was established, isolated some hundreds of yards from the nearest laboratory buildings. The

number of persons allowed to enter was strictly limited and they were in every instance required to disrobe, bathe and don sterile clothing. All dog food and, as far as practicable, everything entering the compound was sterilized. By carrying out these rigid precautions, the introduction of infection was prevented, and four generations of dogs were successfully raised free from distemper. Such animals, when subsequently removed from the compound and exposed to infection, were invariably found to be susceptible. It is the use of only known-susceptible animals throughout their experiments, together with the proper facilities for their isolation during the progress of the experimental work so as to prevent the natural spread of infection, which makes possible an accurate evaluation of the data reported by Laidlaw and Dunkin.

The dogs bred in the compound were not only free from distemper but from infections of any kind, in fact, it would be hard to imagine a healthier lot. One observation of interest in the raising of these dogs free from distemper was the occurrence of vesico-pustules on the abdomen of many dogs in the compound. Such pustules were previously quite commonly believed to be pathognomonic of distemper. Obviously, this view can no longer be substantiated.

The elaborate precautions taken to prevent the spread of infection in test animals are of particular interest since they are vital to a correct interpretation of the results obtained when working with such a highly contagious disease as distemper. At the outset it was attempted to house dogs under experiment in a special building divided into individual cubicles, each entirely separated from the others except for the doors opening on a common central hall. Employes having any contact with infected animals were dressed in rubber boots with rubber coat completely covering their clothing. Entrance to the building was possible only by walking through a short corridor containing three inches of disinfectant solution. On entry to the building and after every visit to a cubicle containing test animal, whether showing symptoms or apparently normal, the hands, coats and boots were thoroughly washed with disinfectant. No two cubicles were opened at the same time, but in spite of these elaborate precautions, infection was found to spread from infected to healthy control animals when the building was filled with dogs.

It was believed that the spread of infection was due to contamination of the air enclosed in the building. Isolating dogs under test in small pens in the open air, each separated from its nearest neighbor by a distance of 15 or 20 yards, overcame this difficulty. It was found that a susceptible dog could be left for months in one kennel while experiments were carried on with infected dogs in adjacent kennels, without the disease being transmitted. Observing the same precautions of disinfection of hands and rubber garments, it was possible for the same attendants to take care of infected and normal susceptible dogs without spreading the disease. The ease with which the infection is destroyed is illustrated by the fact that following thorough cleaning and disinfection with 1 per cent lysol, a kennel and run previously inhabited by an infected dog could safely be used on the following day for a susceptible animal. Birds and, to a limited extent, rats had access to these kennels, and there is no evidence that the disease was ever conveyed in this manner. This is in keeping with similar observations on the spread of hog cholera, likewise a highly contagious filtrable-virus disease.

The ordinary laboratory animals are not susceptible to distemper and had it been necessary to utilize only dogs, the investigations would have been very much delayed due to the limited numbers which could be raised. Much of the success of the work may be attributed to the use of ferrets as laboratory animals. They were found to be admirably suited for this work, being exceedingly susceptible to distemper and the disease almost invariably proving fatal. The majority of the ferrets used were raised on the premises under strict quarantine. It was found that purchased ferrets also could be employed satisfactorily, since it was very unusual ever to encounter one resistant to distemper. Ferrets, therefore, afforded an ideal means for the detection of distemper infection.

The cubicle building, previously described as originally used for dogs, proved satisfactory for the housing of ferrets under test. The ferrets were placed in Topley cages, quite similar to a large metal cracker-box, which permitted examining the animal without handling. It was found possible to keep infected ferrets in one cubicle without the disease appearing in normal control ferrets in an adjacent cubicle. When an infected ferret and a normal ferret were placed in the same cubicle, but in separate cages, infection of the control was found to occur. This illustrates the highly contagious nature of the disease and also that contact

is not necessary, the infection undoubtedly being air-borne in limited closed spaces.

Nature of the Infective Agent

Distemper may be readily transmitted to healthy dogs or ferrets by injecting subcutaneously a minute quantity of blood or emulsion of tissue from a diseased animal. Such infective material when cultured invariably proved sterile. Ultimately the investigators succeeded in filtering the infective principle through standard bacterial filters with uniformly successful results, thereby confirming the previous contention of Carré that the disease in its simplest form is due solely to a filtrable virus.

The virus is known to be present in the nasal discharge and in the blood at the early stage of the disease, being uncertain in the later stages. All attempts to cultivate the virus artificially have so far failed, nor has there been any evidence of multiplication of the virus outside the body of a susceptible animal.

Experimental Distemper in Dogs

When healthy dogs were artificially infected with distemper, it was observed that the resulting disease is quite distinct from the complex picture presented in cases encountered under field conditions. Particularly noticeable was the almost complete absence of broncho-pneumonia, a very common complication in the disease as naturally encountered. The naturally occurring disease is spread by contact between healthy and diseased dogs and the various complications are attributed to the secondary infections. When healthy dogs are infected by the injection of a minute dose of virus, the secondary infections are excluded, with the result that the disease runs an uncomplicated course with a comparatively low mortality and a favorable prognosis except when nervous symptoms develop.

Experimental distemper in the dog is characterized by a remarkably constant incubation period of four days, at which time the temperature rises with almost clock-like regularity, reaching as high as 105°F. or higher. After one or two days, this drops to normal and is followed by a secondary rise usually slower and more prolonged. The secondary rise may vary in duration from two days in mild cases to as long as three weeks in severe cases. At the onset of the disease there occurs a watery discharge from the eyes and nose, later becoming purulent. Vomiting is common and the animal refuses food. With the drop of temperature the appetite returns but diminishes with the secondary temperature

rise, which is almost invariably accompanied by diarrhea. The feces become slimy and tinged with blood and of offensive odor.

The lack of appetite and diarrhea result in rapid wasting. In some cases nervous complications develop, manifested by fits. Considerable variation was noted in the severity of the disease in individual dogs and this was attributed to differences in susceptibility and in the degree of virulence of different strains of virus.

Distemper in Ferrets

In ferrets the incubation period for distemper is about ten days on the average, being as short as six to seven days when large doses of very active virus are given. The disease is first manifested by a watery discharge from the eyes and nose, which soon becomes purulent, eventually resulting in glueing of the eyelids. Minute vesicles appear on the chin, later developing into small pustules. The feet become swollen, the pads red, and there is occasionally reddening of the skin of the lower half of the abdomen. As the disease progresses, the ferret refuses all food and curls up in a corner of the cage, becoming gradually weaker. They are often moribund on the fifth or sixth day after the onset and succumb almost without exception. Those which did happen to recover were found subsequently immune not only to the strain of virus responsible for the initial infection but to all other strains obtainable.

Having observed that ferrets recovered from one attack of distemper were subsequently resistant to even massive doses of virus, experiments were undertaken to accomplish this result without inducing the disease.

Briefly, it was found that the injection of a single dose of vaccine prepared from distemper-infected ferret tissues inactivated by formalin would confer sufficient immunity to protect against a subsequent dose of living virus. Ferrets which had received both vaccine and virus were found to be solidly immune and this paved the way for the development of an effective prophylactic vaccination for dogs. Curiously enough, ferret-tissue vaccine which would satisfactorily immunize ferrets in a single injection failed to confer sufficient immunity when used in a single injection on dogs to protect against a subsequent dose of living virus. Even when the size of the dose was increased, the results were still unsatisfactory. Only by giving three doses, at weekly intervals, was sufficient immunity conferred on dogs

to protect against a subsequent dose of virus which was infective for the control animals.

Preparation of Distemper Vaccine for Dogs

In view of these experiences and based on the publications of Puntoni and Lebailly, who had reported on the use of vaccines from dog tissues, the preparation of distemper vaccine from infected tissues from dogs was undertaken. It was found that abdominal lymph-glands, spleen, liver and brain, from infected dogs, could be made into effective vaccine only when the tissues were rich in virus content. This was determined by injecting ferrets with dilutions of tissue suspension in normal saline corresponding to .0,001 gram and .00,001 gram of the original tissue. Tissues which failed to infect ferrets in a dose of .0,001 gram proved worthless for vaccine production. Tissues infective in this dose yielded vaccine of questionable value, while those infective in a dose of .00001 gram produced vaccine which invariably protected susceptible dogs against a subsequent dose of virus seven days later.

Determination of the stage of the disease at which the dog should be killed for the collection of tissues for vaccine preparation is largely a matter of experience, but in general this should be when the dog is hardest hit by the disease. Spleens collected from dogs killed between the seventh and sixteenth days following inoculation were found to possess a fairly high virus content. The brains from dogs showing nervous involvement were frequently found to be sufficiently rich in virus to be suitable for use in vaccine. Incidentally, in the same animal, the spleen might be found to be high in virus content and the liver relatively poor. On the other hand, in dogs in which the liver proved rich in virus, the spleen also was invariably of high virus content.

In the preparation of vaccine the infected dog is killed by chloroform, and the liver, spleen and mesenteric lymph-glands are removed aseptically.

The weighed tissues are individually minced finely, ground in a mortar and a 20 per cent suspension made in sterile saline. This is shaken with sterile beads to defibrinate and is then filtered through sterile butter-muslin, samples being taken for determination of virus content, as previously explained. Formalin (0.25 per cent) is then added, which not only inactivates the virus but usually renders the suspension sterile when examined after four days in the ice-box. Suspensions of tissues of proven satis-

factory virus content are subsequently mixed to constitute a batch of vaccine.

The protective value of the vaccine is tested on known susceptible dogs obtained from the stock raised in the quarantine compound. Four such dogs, about three months of age, are placed together in an isolation test-pen. Two are injected subcutaneously with 5 cc each of vaccine, the other two serving as controls. Seven days later, all four dogs are injected with approximately .25 cc of 1 per cent suspension of fresh active virus spleen. If the vaccine is satisfactory, the vaccinated dogs resist this dose of virus, not showing more than a slight malaise with at times a transitory rise in temperature for a day or two. The control dogs, after a 4-day incubation period, come down with typical distemper, as previously described. In many instances there is no temperature rise in the vaccinated dogs following the virus injection and yet the immunity has proven to be just as solid and lasting.

Dogs immunized by a dose of vaccine followed by living virus will subsequently resist large doses of all strains of distemper virus. Sufficient time has not elapsed to learn whether this immunity persists for the life of the animal though it is believed probable. Vaccinated dogs, for example, have been found still immune when exposed to natural infection two years after vaccination.

Dogs treated with dead vaccine alone acquire an immunity of questionable duration, and the subsequent injection of living virus is necessary for a lasting immunity.

Field Results

To determine the value of the vaccine in actual practice under field conditions, vaccine and virus were supplied to veterinarians located in widely separated sections of England, who vaccinated approximately 2000 dogs and subsequently reported on the results obtained. These animals included puppies as young as six weeks and represented many different breeds. The tests have extended over a period of two years and the results have been most satisfactory, conclusively demonstrating that the method is not only safe when properly employed, but that it confers a positive immunity against natural infection. In repeated instances vaccinated dogs have been subsequently placed in kennels with other dogs suffering from a virulent form of dis-

temper, and have failed to contract the disease or show any illness.

The reports indicate that out of approximately 2000 dogs vaccinated, only fourteen developed some disease. Careful laboratory tests revealed the virus in only two of these fourteen, so that the twelve others doubtless succumbed to some disease other than distemper.

In an excellent paper published in the *Veterinary Record* of Feb. 2, 1929, Major A. A. Comerford has given in detail his results obtained in two years' field experience with this immunizing treatment. He reports having treated over 400 dogs of all ages from six weeks old upwards, without a single failure. Among the dogs which he left unvaccinated as controls the usual losses from distemper occurred, whereas the vaccinated animals failed to contract the disease.

While the administration of vaccine and virus confers a very solid immunity against distemper, it is not believed that dogs so treated can be considered immune to *B. bronchisepticus* since this is in reality a separate infection. It is significant, however, that vaccine-virus-treated dogs, when later exposed to distemper cases, are apparently enabled to withstand these secondary infections. This is in keeping with the belief that these secondary invaders usually gain the upper hand only when the resistance of the animal has first been lowered by the devitalizing action of a primary distemper infection.

Since the vaccination involves the injection of living infective virus, it cannot with safety be recommended for use other than by properly qualified veterinarians, who will observe every precaution in the selection of animals to be vaccinated as well as in the actual administration of the products. It is particularly essential that only normal dogs be treated, which are known not to have been exposed to distemper for a period of fourteen days previously. Also vaccinated dogs must not be exposed to distemper during the necessary ten days following injection of the vaccine, for its immunizing action to be produced. A daily temperature record for several days prior to the administration of the vaccine and particularly during the interval between the injection of vaccine and virus is of invaluable assistance.

Should there occur an undue temperature rise following the injection of vaccine, the dose of virus should not be given. Obviously, the vaccination of sick dogs or those in the incubative

stage cannot be successful and merely tends to discredit the method.

Like other filtrable viruses, the virus of canine distemper in its fresh state rapidly becomes inactive at ordinary temperatures. Stored in the frozen state, virus may retain its infectivity for a period of weeks. Freshly removed infected tissues, dried in vacuum over phosphorus pentoxid and subsequently stored at a low temperature, were found to be infective in some instances as long as 142 days. This apparently affords the best means at present of conserving the activity of the virus. At best, the virus is relatively short-lived and must always be stored in the cold to safeguard against deterioration.

Anti-Canine Distemper Serum

By repeatedly injecting immune dogs with massive doses of dog-distemper virus, it has been possible to prepare an antiserum with valuable protective properties. While this work was regarded as incomplete at the time of my visit, many points remaining to be solved, serum had been obtained of sufficient potency to protect susceptible dogs against many fatal doses of distemper virus administered simultaneously. It is to be hoped that it may ultimately be possible to immunize dogs satisfactorily and safely by the simultaneous injection of immune serum and active virus, as in the case of hog cholera. This would have the advantage of being carried out at one time instead of the two distinct injections as now required.

Such immune serum used alone is doubtless of value as a prophylactic where it is desired to confer an immediate though passive immunity. It should also prove of value in the incubative stage of the disease in assisting to arrest the infection and may possibly be of benefit even after symptoms have developed.

In conclusion, anyone who has the opportunity of personal contact with the studies conducted at Mill Hill on distemper cannot come away without a strong feeling of admiration for the thorough and painstaking manner in which these researches have been conducted as well as with a conviction that the work of Laidlaw and Dunkin is fundamentally sound.

Sixty-three cases of undulant fever were reported in 1929 in one Ohio city. Elsewhere, we believe, the craze for Hawaiian dancing has more or less subsided.—*The Detroit News.*

CARBOHYDRATES PRODUCED BY TUBERCLE BACILLI

By M. DORSET *and* R. R. HENLEY

U. S. Bureau of Animal Industry, Washington, D. C.

Until very recently, proteins were considered to be essential, not only for the stimulation of antibody response in the animal body but also for the consummation of specific immune reactions *in vitro*. However, as a result of the splendid pioneer work of Heidelberger and Avery[1] on the pneumococcus, we have come to realize that complex carbohydrates, found in many species of bacteria, frequently have the property of causing specific precipitation and complement-fixation.

It has long been known that the bodies of tubercle bacilli contain carbohydrates. Various authors have reported that sugars capable of reducing Fehling's solution are obtained by heating tubercle bacilli with dilute mineral acids and several (Bendix,[2] Tamura,[3] and others) have obtained positive reactions for pentoses. Tamura reported the detection of arabinose in the bodies of tubercle bacilli. Laidlaw and Dudley[4] separated from the bodies of tubercle bacilli, grown on broth, a complex carbohydrate of the nature of a gum. This gum was found to have the power to cause specific precipitation with immune sera even in dilutions as high as 1 to 6,400,000. About the same time, Mueller[5,6] reported the separation of a similar gum from tuberculin.

Both Mueller and Laidlaw and Dudley state that the complex carbohydrates separated by them are devoid of power to produce skin reactions in tuberculous animals, notwithstanding the very high specific precipitating power for immune serum and the ability to fix complement (Mueller[5]).

Somewhat later, Anderson[7] obtained from moist, living tubercle bacilli a polysaccharide with which White[8] was able to produce a rise in temperature in normal guinea pigs as well as in those which had been infected with tuberculosis only three weeks previously. In the case of guinea pigs with more advanced tuberculosis, there occurred, soon after injection of the polysaccharide, a steady fall in temperature, accompanied by marked prostration and followed, at times, by death in four to five hours.

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White[8] states that Johnson and Renfrew[9] found in the medium of growth of tubercle bacilli a polysaccharide possessing the same properties as the polysaccharide of Anderson, but we have been unable to find any discussion of this in the cited reference.

None of the authors mentioned above give much information concerning the constitution of the interesting polysaccharide of the tubercle bacillus. Laidlaw and Dudley and Mueller state that their products do not reduce Fehling's solution, but after heating with mineral acids the complex undergoes hydrolysis and then reduces copper solutions. They also report that this gum gives the usual reactions for pentoses, but they do not identify the individual sugars which are united to form the complex substance.

In our own studies of tuberculin we, also, have constantly encountered this peculiar polysaccharide in the tuberculins prepared from cultures (human type) on the sugar-free, synthetic medium previously described.[10] The polysaccharide is precipitated almost completely from concentrated solutions by ten volumes of alcohol or acetone. The product thus obtained is crude and may be greatly purified by precipitation of proteins and other substances with lead acetate, copper sulphate, acetic acid, ammonium sulphate and other reagents. The saccharide itself is precipitated by any of the well-known methods, such as lead acetate and ammonia, alkaline copper solutions, and barium or calcium hydroxide from alcoholic solutions. The nearly white substance obtained after removal of the precipitants by appropriate means, responds to the Molisch test for carbohydrates, gives characteristic pentose reactions but does not reduce Fehling's solution and is negative to the napthoresorcin test for glucuronic acid. The biuret test for protein is usually positive. We have not had the opportunity to study the precipitating and complement-fixing power of this polysaccharide but have noted that at times it possesses the power to elicit tuberculin reactions in infected guinea pigs. The degree of tuberculin potency in different lots has varied considerably, being usually least after repeated attempts to remove the proteins. We have not as yet been able to decide whether the protein is actually in chemical union with the carbohydrate or whether it is present merely as an impurity.

The principal result of our study of the polysaccharide has been the isolation and identification of two sugars which take part in its structure. We found this complex to be comparatively re-

sistant to acid hydrolysis, for, although it reduced Fehling's solution after short heating with dilute acids, it did not become completely hydrolyzed unless heated in the autoclave at 15 pounds pressure, with rather strong (10 per cent) hydrochloric acid. From the solutions of the hydrolyzed polysaccharide we have been able to separate characteristic compounds of the pentose sugar, arabinose, and of the hexose sugar, mannose. We have found that the greater part of the arabinose along with some mannose can be obtained by first heating the solution in the autoclave with 2 per cent sulphuric acid. The portion which remains unhydrolyzed at this point is precipitated and separated from the free arabinose by means of 80 per cent alcohol. This residue is then further hydrolyzed by heating in the autoclave with rather strong (10 per cent) hydrochloric acid. This second acid treatment yields comparatively large amounts of mannose with very little arabinose.

The identification of arabinose and mannose was accomplished by the preparation of the following compounds from the hydrolyzed tubercle gum:

1. Arabinose di-phenylhydrazone
2. Arabinose benzylphenylhydrazone
3. Arabinose benzhydrazid (from aqueous solution)
4. Arabinose phenylosazone
5. Mannose phenylhydrazone
6. Mannose para-tolylhydrazone
7. Mannose phenylyosazone

The melting points and other properties of the above compounds agree with those of the same compounds from the corresponding known sugars.

The culture filtrate from bovine-type tubercle bacilli grown on the same synthetic culture medium yielded a polysaccharide of the same type as that obtained from cultures of the human type of bacilli. Both arabinose and mannose were found in the bovine type tuberculin. The same two sugars, in comparatively very small amounts, have been detected in similar filtrates from the avian-type tubercle bacillus.

It is not to be concluded, of course, that arabinose and mannose are the only sugars produced by tubercle bacilli. Perhaps other sugars, as yet unrecognized, may be built up and there is also the possibility that the nature of the sugars may be dependent upon

the composition of the culture medium. These and other interesting problems must await further study.

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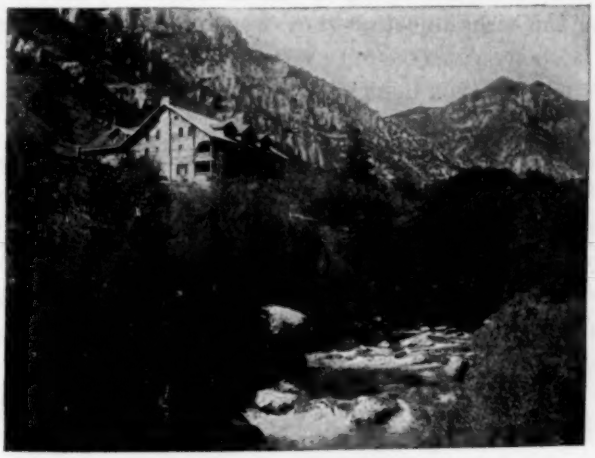
[3]Tamura: Zeit. f. Physiol. Chem., lxxxix (1914), p. 304.
[4]Laidlaw and Dudley: Brit. Jour. Exp. Path., vi (1925), p. 197.
[5]Mueller: Proc. Soc. Exp. Biol. & Med., xxii (1924-25), p. 209.
[6]Mueller: Jour. Exp. Med., xliii (1926), pp. 1, 9.
[7]Anderson: Jour. Biol. Chem., lxxiv (1927), p. 525.
[8]White: Trans. Asso. Amer. Phys., xliii (1928), p. 311.
[9]Johnson and Renfrew: Amer. Rev. Tuber., xvii (1928), p. 508.
[10]Dorset, Henley and Moskey: Jour. A. V. M. A., lxx (1926), n. s. 23 (3), pp. 373-377.

Vesicular Stomatitis and Foot-and-Mouth Disease

The similarity of the early symptoms of vesicular stomatitis, a disease of horses and cattle, to those of foot-and-mouth disease of cattle and other live stock has sometimes been the cause of alarm to owners of live stock and occasionally to veterinarians. Although there have been no serious outbreaks of vesicular stomatitis in the United States in recent years, it was discovered in several localities during 1929 and caused some stock-owners to believe that their animals were affected with the more serious malady. A full description of the disease appears in Department Bulletin 662-D, "Vesicular Stomatitis of Horses and Cattle," issued by the U. S. Department of Agriculture.

The difficulties of making a proper diagnosis are explained in the bulletin. All who handle horses and cattle are urged to segregate sick animals immediately, whenever there is any sign of either ailment, and notify the nearest veterinary official so that a correct diagnosis can be made without delay.



Hermitage, Ogden Canyon, Union Pacific System

THE LAIDLAW-DUNKIN DISTEMPER VACCINE

By GERRY B. SCHNELLE

The Angell Memorial Animal Hospital, Boston, Mass.

In the spring of 1929, when the announcement was made that a method of immunization against distemper had been perfected at Mill Hill, I, for one, hailed it with great joy and gladness of heart. No one could go through our distemper ward and see fifty dogs, day after day, some in convulsions, some in the throes of pneumonia, some of them dying, without having pangs of sympathy for our canine friends and without hoping that some day we would have a really successful immunizing agent against this horrible disease.

Because of the failure of every other distemper preventive we had tried, when the first doses of the Laidlaw-Dunkin vaccine reached us in June, it was decided to vaccinate some animals experimentally before trying it on any of our clients' pets. Accordingly, two susceptible dogs were selected and given the vaccine and virus according to the instructions, and four days following the virus injection they were placed in our distemper ward. Both lived there quite happily for more than a month. Then they were given homes in Boston, and both later met their deaths. (See table I.)

In the meantime, a few dog-owners became impatient and requested the treatment regardless of the fact that they were advised that we still considered the product in the experimental stage.

In two kennels where the disease appeared, all the susceptible animals in the kennel contracted the scourge. In one kennel, cases 6, 40 and 41 of this report and a group of five Pointer puppies (unvaccinated), all of which contracted the disease, constituted all the young dogs on the premises. In another kennel,

TABLE I.—*Records of sixteen dogs vaccinated against distemper with Laidlaw-Dunkin vaccine, and known to have been exposed to distemper*

TABLE I—*Records of sixteen dogs vaccinated against distemper with Laidlaw-Dunkin vaccine, and known to have been exposed to distemper subsequently*

CASE	BREED	AGE (MOS.)	WEIGHT (LBS.)	INJECTED		DISTEMPER DIAGNOSED	OUTCOME
				VACCINE (1929)	VIRUS (1929)		
1	Black mongrel	1¾	6½	6–21	7–4	Not diagnosed. (Control)	Died suddenly. Traumatic gastritis
3	Shepherd	2½	12	6–19	7–4	Not diagnosed. (Control)	Died in running fit, 8-15-29. Slight gastritis. Only gross lesions
2	English Setter	6	30	6–20	7–4	11-12-29. Sick for ten days, according to history	Died, 11-16-19. Typical distemper
4	English Setter	16	30	6–18	7–2	Was exposed to case 2 but did not get sick	There was a question whether this dog had previously had distemper or not
5	Collie	3	22	7–16	7–31	9-2-29. Typical distemper	Went into violent convulsions and was destroyed, 9-27-29
6	English Setter	6	40	7–25	8–9	11-15-29. Typical distemper	Died, 12-9-29, in spite of every effort to save its life
12	English Setter	6	30	11–8	11–22	12-10-29. Exposure known six days previously	Recovered after 25 days of serious illness in our hospital
13	English Setter	8	40	8–1	8–15	12-10-29. Place of exposure known to case 12	Recovered with 30 days of home treatment
14	English Setter	6	30	8–1	8–15	12-10-29. Exposure same as case 13	Recovered after 25 days of hospital treatment
18	Pointer	18	45	9–3	9–17	10-15-29. Exposure known to other Pointer which died	Ill only 8 to 10 days; then recovered uneventfully
25	Sealyham	6	15	10–10	10–26	Exposure known, 2-12-29. Distemper diagnosed, 2-19-29	Still sick, 3-7-30
26	Sealyham	6	15	10–10	10–26	Exposure known, 2-12-29. Distemper diagnosed, 2-19-29	Still sick, 3-7-30
27	Sealyham	6	15	10–10	10–26	Exposure known, 2-12-29. Distemper diagnosed, 2-19-29	Still sick, 3-7-30
40	Setter	6	35	9–17	10–3	Exposed to case 2, 11-15-29	Recovered after three weeks of illness
41	Setter	6	35	9–17	10–3	Diagnosed, 11-18-29	Recovered after being very sick. (Immune serum given after disease was known)
44	English Setter	4	25	11–5	11–19	Exposure known, 12-1-29	Recovered after a transitory illness. (Immune serum given as soon as symptoms appeared)

cases 12, 13 and 14, and in a third, cases 25, 26 and 27 were all of the dogs in both places to be exposed.

The vaccine used was ordered frequently and kept at 40° F. The virus was received on the day it was to be used and was kept refrigerated until used.

All of the animals were injected in the hospital and all instructions closely followed. Every dog mentioned in this report had been examined for intestinal parasites preceding vaccination and those requiring treatment were given it at least a month before the vaccine was administered.

These animals are those known to have been exposed out of about 75 dogs which were inoculated at the Angell Memorial Animal Hospital. Of those other than the ones I have mentioned here, we have no knowledge of exposure in the majority, and on the rest we have no accurate check.

In all cases symptomatic treatment was given and large doses of immune serum were used in some of them.

I trust that the originators and the manufacturers of this product will accept this report in the spirit in which it is offered, in the hope that we may clear up a situation which certainly is cloudy to both the practicing veterinarian and the public. I hope also that our teachers in their small-animal clinics will offer something on the subject from which the profession may profit.

I do not feel qualified to theorize as to the cause of these failures, but I do hope that others better fitted may do so publicly.

TWO CASES OF MALIGNANT CATARRHAL FEVER IN CARABAOS

By MANUEL M. ROBLES, *Isabela, Occ. Negros, P. I.*

Case I

Subject: Carabao, male, 10 years old.

History: The animal had been off feed for the last four days, disinclined to move, and both eyes were observed to be reddening, which later became swollen at the eyelids, accompanied by the appearance of a yellowish muco-purulent discharge.

Symptoms: (Observed on the fourth day after the animal was found sick.) The conjunctivae of both eyes were congested, edematous and everted. There was a profuse, yellowish, muco-purulent discharge. The cornea was turbid. The nasal secretion

was yellowish and muco-purulent. The nasal mucosa was dirty bluish-red and covered with a croupous exudate.

The buccal mucosa, especially at the gums, was markedly bluish-red. There were necrotic areas covered with yellow diphtheritic deposits, which on removal revealed erosion ulcers. The feces were liquid and bloody, passed with a great deal of expulsive effort (tenesmus). The animal exhibited a marked indifference to his surroundings, the head was carried low, and there was marked debility, shown by a wobbling gait.

Course: The animal died on the fifth day. (Unfortunately autopsy was not performed on this case.)

FIG. 1. Malignant catarrhal fever in carabao (case II).

Case II

Subject: Carabao, male, 12 years old. (Figure 1.)

History: The animal was found sick 20 days after the first case was reported. Temperature, 39.7° C. Pulse was imperceptible, and respirations were 22 per minute.

Symptoms: Both eyes showed a reddening of the conjunctiva, which later became more hyperemic and edematous, and finally everted. A muco-purulent discharge began to appear on the third day. The cornea became gradually turbid. The nasal secretion, which was at first mucous, became yellowish muco-purulent on the third day.

The buccal mucosa was swollen and bluish-red, especially at the gums. Erosion ulcers covered with yellowish diphtheritic deposits also were found on the gums and dental pad. Diarrhea appeared on the fourth day (not bloody as in case I).

The same general attitude—marked dullness of the sensorium and debility, as observed in case I—was also manifested. On the third day pneumonic symptoms began to appear. Respiration was fast and labored. On auscultation, moist rales were audible.

Course: The animal died on the fourth day.

Postmortem Lesions

Skin and subcutis: Yellowish discoloration of the subcutis.

Eyes: Bluish-red and edematous conjunctivae.

Nasal cavities and turbinates: Mucosa of the nasal meati and the frontal sinuses was congested and covered by a yellowish, croupous exudate.

Mouth, pharynx and trachea: Buccal mucosa showed erosion ulcers on the gums and dental pad. The pharynx and trachea were filled with a croupous exudate covering a mucosa of a dirty reddish hue.

Lungs and bronchioles: Bronchopneumonic lesions were found. The bronchi and bronchioles were filled with a muco-purulent exudate and there was congestion and red hepatization at the apical and cardiac lobes of both lungs.

Heart: Petechial hemorrhages at the coronary grooves. Pericardium was roughly thickened (fibrinous pericarditis).

Digestive tract: Intestinal mucosa showed bluish-red discolorations (congestion).

Liver: Gall-bladder was extremely distended, filled with about a liter of thin bile.

Spleen: Normal.

Urinary system: Bladder showed marked ulcerations on the mucosa (size of mustard-seeds and tapioca).

Remarks

Hutyra and Marek define malignant catarrhal fever as an acute, non-contagious, infectious disease of cattle and buffalo, characterized especially by an inflammation of the mucous membranes of the head, with a simultaneous affection of the eyes and severe nervous symptoms. The disease has been reported to

occur in the Scandinavian peninsula, Denmark, Russia, northern Hungary and Siebenburgen, Transvaal, Netherland-Indies and Java.

As far as the writer knows, the disease has never been previously observed and reported to occur in the Philippine Islands. The two cases herewith mentioned are apparently identical with the ones described by the above authors. Although rinderpest, which is prevalent in the locality, croup of cattle, and infectious keratitis, may cast a shadow of doubt on the diagnosis, yet, the *non-contagiousness* of the cases (only two animals sick out of 40 cattle and carabaos in the herd), the *marked eye and nervous symptoms, postmortem lesions* (of the second case), and their *acute fatal course,* were very similar to those described by some observers in positive cases of malignant catarrhal fever.

BLACKHEAD ASSOCIATED WITH COCCIDIOSIS IN YOUNG CHICKS

By M. W. Emmel, *East Lansing, Mich.*
Michigan Agricultural Experiment Station

During the past year, young birds sent to our laboratory for diagnosis have shown an increased incidence of blackhead. These birds ranged in age from 7 to 18 weeks. Characteristic lesions were found in the liver and in one or both ceca. In many instances amebae could be demonstrated in the ceca but seldom in the liver. These cases have been of peculiar interest, as blackhead was associated with coccidiosis in most of these birds. A total of 57 birds had lesions of blackhead and coccidia were found in the scrapings from the intestinal mucosa in 50 of the birds. A little less than half of them harbored coccidia in the ceca and usually not in abundance. In the few reports received from flock-owners whose birds were so affected, it was stated that after treating the flock for coccidiosis the prevalence of blackhead disappeared. This would seem to indicate that coccidiosis may be a predisposing factor to blackhead in young birds.

SARCOSPORIDIOSIS IN A DUCK

By F. P. Mathews, *Lafayette, Ind.*
Purdue University Agricultural Experiment Station
Department of Veterinary Science

The partially dressed carcass of a Mallard duck, which was represented as a Black Mallard, was sent to this laboratory for

examination. The muscles which were exposed showed a moderate parasitic infestation. Upon removal of the skin all the skeletal muscles were found to be involved but the heaviest infestation had occurred in the superficial layers of the pectoral muscles. The heart, lungs, liver and kidneys were not involved, and inquiry elicited the information that the intestines were likewise free from infestation.

The parasites were gray, roughly cigar-shaped and measured about 1 x 3 mm. The long axis of each parasite was parallel to the course of the muscle fibers. Some of the muscles were incised and, by a moderate application of pressure, several of the parasites were expelled. When macerated in salt solution and examined under the microscope the parasites were found to

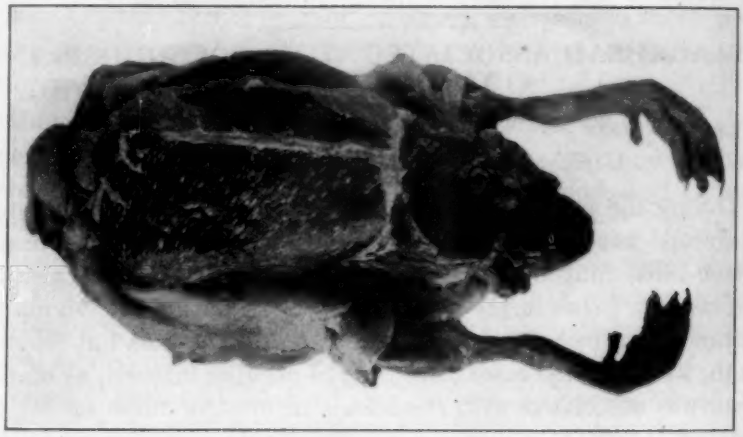


FIG. 1. The carcass of a duck showing an extensive parasitic infestation of the superficial pectoral muscles.

consist of masses of cells held together by a touch stroma. The cells presented a uniform size and shape and resembled somewhat an avian erythrocyte. They were, however, a little larger than erythrocytes and when stained each cell was found to have a nucleus which was located towards the end of the cell.

Sections of the muscles prepared for microscopic study showed the parasites located in the interstices between the muscle fibers. The outer wall of each parasite consisted of a thin, hyaline membrane. Trabeculae composed of material similar to the outer wall extended into the body of the parasite, dividing it into numerous acini of various sizes and shapes. In some of the parasites these acini were packed with cells which stained readily with hematoxylin-eosin. In others only the peripheral acini

contained well-stained cells; the remainder of the acini contained amorphous, poorly-stained material which was evidently the remains of degenerated cells. From a study of the parasites showing various stages of degeneration, it was evident that degeneration began at the center and extended towards the periphery.

The inflammatory response was proportional to the amount of degeneration which had taken place within the body of the parasite. Those exhibiting little or no degenerative changes were

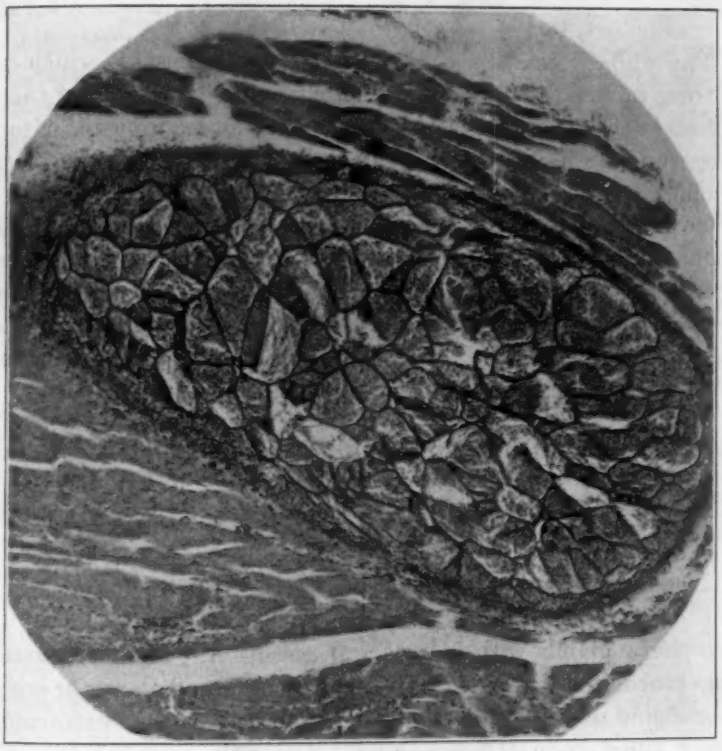


FIG. 2. A cross-section of one of the parasites in which no degeneration has taken place; note the absence of inflammatory reaction.

surrounded by a thin connective tissue capsule. Those in which extensive degeneration had taken place were surrounded by a zone of closely-packed round cells. The cellular response was principally lymphoid in nature and appeared to have been stimulated by the death of the parasite.

In 1893, Stiles[1] described a similar condition and named the parasite *Balbiania rileyi*.

REFERENCE

[1]Stiles, C. W.: U. S. Dept. Agr., B.A.I. Bul. 3 (1893), p. 79.

A Bacteriological Investigation of Cases of Tuberculosis in Five Cats, Sixteen Dogs, a Parrot and a Wallaby. A. W. Stableforth. Jour. Comp. Path. & Therap., xlii (1929), 3, p. 163.

The wallaby must be added to the list of animals which can become infected with bacilli of avian origin. The cases of tuberculosis in the parrot are believed to be the first examples of natural infection in which definite evidence of the human type of the bacillus has been obtained. The bacilli isolated from cats were of bovine type and four were of standard bovine virulence. The human type of tubercle bacillus was isolated from each of ten cases in the dog, and the bovine type was isolated from six cases in each of the remaining six dogs. In six cases due to human bacilli, in which evidence was obtainable, definite association with a case of human tuberculosis was present in four cases.

Experiments to Determine Whether There is a Filterable Form of the Tubercle Bacillus. S. R. Gloyne, R. E. Glover and A. S. Griffith. Jour. Path. & Bact., xxxii (1929), 4, p. 775.

None of the animals inoculated with filtrates showed any of the obvious signs of tuberculosis, such as enlargement of the lymphatic glands with fibrosis and caseation. The eight guinea pigs inoculated with apparently slightly enlarged glands or organs containing doubtful foci were free from any sign of tuberculosis when killed 58 to 115 days later. All of the young guinea pigs were perfectly healthy. The experiments failed to demonstrate the existence of a filtrable form of the tubercle bacillus.

The Pathology of Transmissible Anaemia (Erythromyelosis) in the Fowl; its Similarity to Human Haemopathies. H. P. Bayon. Parasitol., xxi (1929), 4, p. 339.

Progressive anemia was observed in a farm flock of thirty White Leghorns. In diseased birds there was yellowish paleness of the

combs and gills, and mortality was heavy. The anemia was characterized by a lasting diminution in the normal number of erythrocytes, a hemoglobin index less than 1, the preponderance of immature and deformed erythrocytes and the presence of marrow cells of the erythrocyte series in the circulating blood. The leucocytes were normal or slightly below normal in numbers; the monocytes were diminished. The essential pathological lesion is an intravascular proliferation in the marrow of the stem cell of erythrocytes, which results in the blood-stream being overrun with erythroblasts and immature erythrocytes. These are rapidly destroyed in the spleen and liver, while the issue of normal erythrocytes in the marrow is hindered. The myeloblastic elements do not proliferate actively. The spontaneously diseased hens all harbored the cestode, *Davainea proglottina*, in the duodenum, where the helminth caused round-cell infiltration, petechiae and thickening of the intestinal peritoneum. In Davainea-free fowls injections of blood and cellular emulsions of liver and spleen from erythromyelotic fowls caused a condition of hypercythemia which lasted several months. Erythromyelosis was produced in one hen of the same stock from the same farm by intravenous inoculation of blood and tissue from spontaneously diseased fowls. In other hens only a transient type of anemia was produced.

Dermatomycosis of the Sheep Due to Actinomyces Dermatonomus (n. sp.). L. B. Bull. Jour. Exp. Biol. & Med. Sci., vi (1929), 4, p. 301.

A dermatomycosis, due to a species of Actinomyces, affecting young Merino sheep, is described. The cultural characteristics of the causal organism, which has been named *Actinomyces dermatonomus*, are described. One remarkable feature of the disease is the absence of lesions on the more exposed surfaces of the body, except in rare cases, as a secondary manifestation. The numerous and scattered lesions suggest that colonies develop in the fleece when conditions, such as moisture, are favorable and that growth extends between the wool fibers to the skin. When moisture softens the superficial epithelium, injuries or abrasions favor invasion by the Actinomyces. The skin of older animals offers greater resistance. A sero-fibrinous fluid exudes from the surface of the skin and is absorbed by the overlying wool. This gradually dries, matting the wool together, and forming a dense and tough mass. Exudation continues as long as the lesions re-

main active. Chronic lesions become less exudative and more keratogenous or desquamative. The author recommends that, for the purpose of prevention, young animals should be dipped in a 1-to-500 copper sulphate solution towards the end of autumn and again a month later, particularly where the disease is troublesome.

TUBERCULOSIS IN GUINEA PIGS. Henry A. Reisman and Adelaide B. Baylis. Jour. Lab. and Clin. Med., xv (1929), 3, p. 205.

Tuberculosis is quite prevalent in apparently normal guinea pigs. An intracutaneous tuberculin test reveals the presence of a tuberculous lesion in guinea pigs. Guinea pigs injected with dead tubercle bacilli did not develop any sensitivity to tuberculin. Guinea pigs may have a pre-existing tuberculous focus similar to that induced by inoculation. Guinea pigs of certain history should be tested with tuberculin before being employed for the inoculation diagnosis of tuberculosis and other laboratory experiments relative to tuberculosis.

BRUCELLA ABORTUS IN MILK SUPPLY AS A SOURCE OF AGGLUTININS IN HUMAN SERA. Merrill J. King and Dorothy N. Caldwell. Amer. Jour. Med. Sci., clxxviii (1929), p. 115.

Persons with lowered resistance who drink raw milk infected with *Brucella abortus* may develop agglutinins in their blood serum with or without the manifestation of appreciable clinical symptoms of undulant fever. The presence of abortus agglutinins in human serum is evidence of infection with *Br. abortus*. The agglutinins may persist in the serum for months or years after the recovery of the patient. The correlation between the periods of *Br. abortus* infection of the milk supply and the occurrence of the agglutinins in the serum of the patients indicates a bovine origin of the cases of undulant fever reported in this study. *Br. abortus* may be present in small numbers in the milk of infected cows, but the organisms may be eliminated for several years. The presence of *Br. abortus* agglutinins in the blood serum of cows does not determine whether they are discharging *Br. abortus* in their milk. *Br. abortus* was not isolated from the blood or from the urine of the infected cows.

STUDIES ON BOVINE MASTITIS. I—The Bacteriology of Mastitis. F. C. Minett, A. W. Stableforth and S. J. Edwards. Jour. Comp. Path. & Therap., xlii (1929), 4, p. 213.

Of 113 unselected cases of bovine mastitis, 82 were due to streptococci whose cultural and biochemical characters were of a fairly well defined type and to which the name *Streptococcus mastitidis bovis* may be applied. However, 52 strains were hemolytic while the remainder were non-hemolytic forms of the viridans type. Six cases of mastitis were associated with staphlycocci, the clinical course of the disease being more acute than is usual with streptococcus mastitis. *B. pyogenes* was found most commonly in samples of udder secretion from 21 cases of mastitis, nearly all being observed in dry cows shortly before calving. Gram-negative coliform bacteria of diverse characteristics were found to be associated with three cases of mastitis. A description is given also of a case of mastitis caused by an anaerobic organism identified as *B. necrosis.*

Anaerobic Infections in Lambs. W. Lyle Stewart and D. W. Henderson. Jour. Comp. Path. & Therap., xlii (1929), 4, p. 241.

Grass-ill is sometimes confused with lamb dysentery, louping ill and "wool ball." The postmortem picture is one of toxemia produced by an organism which was found to be indistinguishable from *Vibrion septique* (Pasteur). *B. welchii* types of organism have no etiological significance in grass-ill. The authors are unable to suggest what exciting or predisposing cause or causes pave the way for the pathogenic action of *V. septique* in grass-ill. It is thought that frosted foods may chill the abomasum and allow the causal organism to penetrate its wall. Typical *V. septique* infections were produced in two healthy lambs. The lesions produced were similar to those naturally occurring cases of grass-ill.

Absorption of Agglutinins by "R" Variants of Bovine and Porcine Strains of Brucella Abortus. B. S. Henry. Pro. Soc. Exp. Biol. & Med., xxvii (1929), 1, p. 8.

"R" variants of seven strains of bovine source, eight strains of porcine source and one strain from a spontaneously infected laboratory guinea pig were obtained by growing the cultures in broth plus 10 per cent anti-*Brucella abortus* rabbit serum. Cells for absorption were obtained by growing the several cultures on 1 per cent glucose-2 per cent glycerin agar in sealed Blake bottles. The absorption was accomplished by the addition to antiserum of the same quantity of various antigen suspensions

which had been standardized to 1.5 mm. on the Gates opacimeter. In further absorption of the serum, definite quantities of the standard suspensions were centrifuged until clear and the packed cells added to the serum. Of the seven bovine strains tested, five showed relatively large absorbing capacity, one absorbed to a lesser degree than the other bovine strains, but more completely than did any of the porcine. Of the strains of porcine source, six showed slight absorbing power, one was only slightly less active than one of the bovine strains and one gave a reaction similar to the bovine group. The strain isolated from the spontaneously infected guinea pig behaved like the majority of bovine origin. *Brucella abortus* antisera from rabbits, cows and guinea pigs were used with results very similar. The serologic difference shown here between the "R" variants suggests a division of the *Brucella abortus* strains into two groups.

THE NATURE OF TUBERCULOSIS CASEATION. W. Pagel. Abst. Arch. Path., ix (1930), 1, p. 114.

In an experiment in which human tuberculous tissues were transplanted into skin pockets of normal and tuberculous guinea pigs, two varieties of tuberculous softening could be distinguished: (1) circumscribed softening in non-allergic animals in close relation with local bacterial proliferation; and (2) extensive leukocyte digestion of the transplanted tissues in allergic animals.

THE DISTRIBUTION OF B. TETANI IN THE INTESTINES OF ANIMALS. John C. Kerrin. Jour. Exp. Path., x (1929), 6, p. 370.

B. tetani has been isolated from the feces of a large number of animals and also from the intestinal contents of the domestic fowl. The stools of human beings in this area have been consistently negative. The existence of a large number of atoxic strains, as reported by Fildes, has been confirmed. These show a distribution similar to the toxic types and produce tetanolysin.

IMMUNOLOGIC ASPECTS OF THE SEXUAL CYCLE. I—Anaphylactic Studies with Mammalian Follicular Fluid. W. R. Lyons and F. Rene Van de Carr. Arch. Path., ix (1930), 1, p. 1.

Male guinea pigs were used to show by means of gross anaphylactic reactions the relationship of various mammalian follicular fluids. These animals, when sensitized to sow's or cow's follicular

fluid, responded with the typical anaphylactic syndrome on the subsequent injection of sow's, cow's, ewe's or mare's follicular fluid. None showed ill effects from primary intracardial or intraperitoneal injection of these fluids. Guinea pig follicular fluid is auto-antigenic. Guinea pigs artificially sensitized to follicular fluid proteins are temporarily desensitized by the liberation of their own follicular fluid. Fatal anaphylaxis may be produced at a definite time, in normal guinea pigs, on primary injection of heterologous follicular fluid.

Recent Developments in Tularemia. Walter M. Simpson. Jour. Lab. & Clin. Med., xv (1930), 4, p. 311.

Recent advances in our knowledge of tularemia indicate that it is a world-wide disease. Over 1000 cases have been recently discovered in Russia. Over 800 cases have been reported during the past five years from 40 states and the District of Columbia in this country. While wild rabbits continue to be the great reservoir of infection, many new animal hosts (wild rats and mice, sheep, muskrats, opossums, woodchucks, cats and game birds) and new insect vectors have been discovered during the past few years, thus pointing to the ever-widening dissemination of the disease among lower animal life and to new sources of infection for human beings.

The Effect Upon Animals of Inoculation with the Virus of Poliomyelitis. I—Rabbits. Paul H. Harmon, Howard J. Shaughnessy and Francis B. Gordon. Jour. Prev. Med., iv (1930), 1, p. 59.

In attempts to transfer poliomyelitis to a series of young rabbits with monkey-passage virus of proven pathogenicity, no evidence was obtained that rabbits are susceptible to the disease. The occasional death of inoculated rabbits, sometimes with suggestive motor symptoms, is explained upon the ground of the exquisite susceptibility of young rabbits to intercurrent infections. Convulsive seizures and other motor symptoms, as well as certain cellular changes in the central nervous system of inoculated rabbits, are non-specific in nature and were observed in rabbits inoculated with both normal rabbit brain and normal monkey brain, and in uninoculated young rabbits.

PHARMACEUTICAL RECIPE BOOK. Prepared by the Committee on Recipe Book and on Unofficial Formulas of the American Pharmaceutical Association. First edition. 454 pages. American Pharmaceutical Asso., Baltimore, 1929.

The preface states that this book "represents the outcome of an effort of the American Pharmaceutical Association to place in the hands of the practicing pharmacist a reliable and comprehensive book of recipes applicable to his business. It marks the initial venture of the Association into a new field of service, where, it is hoped, this book will eventually assume the same serviceable and dignified position that the National Formulary has attained in its particular field."

Veterinarians will be interested most in part 5, containing veterinary formulas, under divisions headed bird preparations, cattle preparations, dog remedies, etc. Under bird preparations we note a formula for "food for mocking bird." Under cattle preparations will be found a "remedy for diminished milk secretion." Under dog remedies (this should be popular) we find one for constipation, one for distemper (!), two for fleas and one for mange. Then comes a recipe for a hog powder, containing eight ingredients. Corn meal is one of them, which should help some. Under horse preparations is a spavin remedy and under poultry preparations we find a "hen tonic" and a roup remedy.

Immediately following the veterinary section is part 6, devoted to photographic formulas; then part 7, given over to cosmetics (this is good, especially the eyelash pomade, the mustache wax and the cuticle remover); part 8, on flavoring extracts, and part 9, miscellaneous. Here we find about everything from a formula for china cement to one for a rat poison, as well as a fertilizer for potted plants and anti-freeze mixtures.

In this book we find a partial explanation for the change which has come about in the institution which was at one time known as an apothecary shop, and which now has many of the attributes of a modern department store.

UNDULANT FEVER IN HUMANS AND CONTAGIOUS ABORTION IN ANIMALS. L. C. Bulmer, B. S., N. D. D. (Eng.), Director, Bureau of Dairy Inspection, Jefferson County (Ala.) Board of Health. 2nd edition. 66 pp. Illustrated. Technical Service Bureau, Birmingham, Ala., 1930. Paper, $1.60.

This monograph summarizes available information on undulant fever and contagious abortion and the relationship of one disease to the other, particularly from the standpoint of transmission through milk and dairy products. Considering the interest that has been created in this subject recently, there should be quite a demand for a comprehensive review of our latest knowledge concerning the problem. The monograph is divided into twenty chapters, followed by a bibliography of 135 titles, an index of names and an index of subjects.

Among other recommendations made by the author is one suggesting the alternatives of compulsory pasteurization or the maintenance of an abortion-free herd, to be determined and approved by the local board of health. Veterinarians will find much valuable information in this publication, condensed and conveniently available.

LABORATORY MANUAL OF PHYSIOLOGICAL CHEMISTRY. D. Wright Wilson, Professor of Physiological Chemistry, University of Pennsylvania. 272 pp. Williams and Wilkins, Baltimore, 1928. Cloth, $3.50.

A teaching manual designed for use by medical, dental and veterinary students, based on ten years of teaching experience by the author at the University of Pennsylvania and Johns Hopkins Medical School. The book is interleaved for the purpose of doing away with the necessity of an additional laboratory notebook. Part I is introductory and part II covers the physiological chemistry of the body tissues and fluids. In addition to the experiments regularly assigned in student work, others are available for special work. The concluding section of the book outlines experiments for the purpose of demonstrating the various dietary deficiencies in laboratory animals.

PRÉCIS DE DIAGNOSTIC VÉTÉRINAIRE. (Compend of Veterinary Diagnosis.) A. Monvoisin and R. Moussu, Veterinary School, Alfort, France. 2nd edition. 472 pages, with 229 figures. Vigot Freres, Paris, 1929. Cloth, 40 fr.

This is the second edition of this manual of veterinary diagnostic procedure by two well-known French veterinarians on the staff of the Veterinary School at Alfort, who have collaborated in the preparation of seven other scientific books. In an orderly fashion directions are given for examining the different regions and organs of the body, followed by chapters on vices and contagious diseases. The book is profusely illustrated. Some of the half-tones are in two colors, and there are six full-page plates in colors which add materially to the attractiveness of the manual.

Diseased Meat Seized

Failure to comply with the federal law requiring inspection of meat transported from one state to another resulted in fines aggregating $2,950 for ten men who carried on operations as the United Meat Company, of Wilkes-Barre, Pa., according to an announcement by the meat inspection service of the U. S. Bureau of Animal Industry. The men were charged with transporting uninspected, contaminated and diseased meat from New York to Pennsylvania.

When the alleged trucking of uninspected meats into Pennsylvania was reported to department officials, J. F. Rafferty, of the federal meat-inspection service in New York City, was assigned to make an investigation. With Dr. E. C. Yoder, of the Tuberculosis Eradication Division of the Department, Mr. Rafferty commenced a day-and-night watch. Early one morning they followed a suspected truckload of meat across the state line, where it was then intercepted and seized by Pennsylvania state police, with whom the federal men were cooperating. The meat was destroyed when found to be unfit for food.

Seven of the ten men were fined $250 each by Judge Albert L. Watson, in the Federal Court, Scranton, Pa. The three others contested the charge and, in attempting to show that an individual shipper was responsible for the violations, brought out enough evidence against themselves to warrant the court imposing fines of $400 each.

New York Meeting Postponed

The fortieth annual meeting of the New York State Veterinary Medical Society, to be held in Ithaca, N. Y., will not be held at the usual time, but has been postponed until some time in September, on account of the International Veterinary Congress in London.

PUBLICATIONS RECEIVED

National Research Council Organization and Members 1929-1930. Washington, D. C., 1929, pp. 65.

An Avian Disease New to the Philippines. A. K. Gomez. Reprint from *Philippine Agriculturist*, xviii (1930), 8, pp. 505-511.

Calcium Gluconate as a Specific in Milk Fever. J. Russell Greig. Reprint from *Vet. Rec.*, x (1930), p. 115.

The 1929 Outbreak of Foot-and-Mouth Disease in Southern California. (Misc. Pub. 68. U. S. Dept. of Agr., Washington, D. C., 1930.) Illustrated. pp. 15.

Castrating and Docking Lambs. (Farmer's Bull. 1134. U. S. Dept. of Agr., Washington, D. C., 1930.) Illustrated. pp. 12.

The Normal Breeding Season and Gestation Period of Martens. (Cir. 107. U. S. Dept. of Agr., Washington, D. C., 1930.) pp. 7.

La Psitacosis en la Republica Argentina. Enrique Barros. Reprint from *Revista Asociacion Medica Argentina*, xliii (1930), 289-290.

University of Pennsylvania Bulletin. School of Veterinary Medicine, Announcement, 1930-1931. Philadelphia, Pa., 1930.

Institut Agricole d'Oka et Ecole de Médecine Vétérinaire de la Province de Québec. (Announcement) La Trappe, Que., 1930.

Porto Rico, Annual Report of the Insular Experiment Station of the Department of Agriculture of. Fiscal Year 1927-1928. San Juan, P. R. pp. 108.

Food, Drug, and Insecticide Administration of the United States Department of Agriculture. (Misc. Pub. 48. U. S. Dept. Agr., Washington, D. C., 1929.) pp. 20.

Hippuric Acid Elimination in the Urine of Cattle. E. A. Hewitt. Reprint from *Corn. Vet.*, xix (1929), 3, pp. 318-326.

The Pathogenicity of the Species of the Genus Brucella for the Fowl. I. Forest Huddleson and M. W. Emmel. (Tech. Bul. 103. Mich. State College Agr. Exp. Sta., August, 1929.) pp. 30.

The Results of Repeated Testing by the Agglutination Method for the Detection of Bacillary White Diarrhea in Adult Chickens. H. C. H. Kernkamp. Reprint from *Corn. Vet.*, xix (1929), 4, pp. 357-368.

Talking Turkey. W. A. Billings. Reprint from *Capper's Farmer*, Topeka, Kans.

Stock-Poisoning Plants of the Range. C. D. Marsh. (Bul. 1245. U. S. Dept. Agr., Washington, D. C., 1929.) Illustrated. pp. 75.

Toxicity of Sodium Chlorate ($NaClO_3$) for Cattle. C. P. Fitch, W. L. Boyd and E. A. Hewitt. Reprint from *Corn. Vet.*, xix (1929), 4, pp. 373-376.

Rearing Dairy Heifers Free from Tuberculosis and Abortion Disease. C. M. Haring. (Cir. 33. Calif. Agr. Extension Service, October 1929.) Illustrated. pp. 19.

Economic Benefits of Eradicating Tuberculosis from Livestock. John R. Mohler, A. E. Wight and L. B. Ernest. (Misc. Pub. 66. U. S. Dept. Agr., Washington, D. C., December, 1929.) Illustrated. pp. 24.

Rinderpest Research in Kenya. J. Walker. (Bul. 8A of 1929. Dept. of Agr. Colony and Protectorate of Kenya, Nairobi.) pp. 21.

Prophylactic Vaccination Against Rinderpest. R. Daubney. (Bul. 8B of 1929. Dept. of Agr. Colony and Protectorate of Kenya, Nairobi.) pp. 26.

Pleuro-Pneumonia Contagiosa Bovum. J. Walker. (Bul. 8C of 1929. Dept. of Agr. Colony and Protectorate of Kenya, Nairobi.) pp. 24.

Memorandum of Horse Sickness Immunization. S. H. Whitworth. (Bul. 8D of 1929. Dept. of Agr. Colony and Protectorate of Kenya, Nairobi.) pp. 7.

Contagious Pleuro-Pneumonia of Goats in East Africa. R. W. M. Mettam. (Bul. 8E of 1929. Dept. of Agr. Colony and Protectorate of Kenya, Nairobi.) pp. 6.

East Coast Fever. Artificial Immunization and Immunity in Their Relation to the Control of East Coast Fever. J. Walker and S. H. Whitworth. (Bul. 8F of 1929. Dept. of Agr. Colony and Protectorate of Kenya, Nairobi.) pp. 18.

Memorandum of Research on East African Swine Fever Immunization in Kenya. J. Walker. (Bul. 8G of 1929. Dept. of Agr. Colony and Protectorate of Kenya, Nairobi.) pp. 13.

Veterinary Education with Particular Reference to State Services in the Tropics. R. Daubney and R. W. Mettam. (Bul. 8H of 1929. Dept. of Agr. Colony and Protectorate of Kenya, Nairobi.) pp. 9.

Veterinary Education of Natives. A. G. Doherty. (Bul. 8J of 1929. Dept. of Agr. Colony and Protectorate of Kenya, Nairobi.) pp. 2.

Report of the National Research Council for the year July 1, 1928-June 30, 1929. Reprint from *Ann. Rpt. Nat'l Academy of Sci., 1928-1929*, Washington D. C. pp. 111.

Agricultural Census 1929. Dept. of Agr. Colony and Protectorate of Kenya, Nairobi. pp. 41.

Pullorum Disease (Bacillary White Diarrhea of Chickens). J. R. Beach and S. T. Michael. (Bul. 486, Calif. Agr. Exp. Sta., Berkeley, Calif., 1930.) Illustrated. pp. 31.

Feeding and Diseases of the Fox. Ronald G. Law. (Bul. 2. Dept. of Game & Fisheries, Toronto, Ont., 1930.) pp. 48.

Report of the Royal Commission on Technical and Professional Services, February, 1930. Ottawa, Ont. pp. 60.

The Register of Veterinary Surgeons. Royal College of Veterinary Surgeons, London, 1930. pp. 381.

Johne's Disease (Paratuberculosis) of Livestock. Elmer Lash and William M. Mohler. (Cir. 104. U. S. Dept. Agr., Washington, D. C., March, 1930.) pp. 8.

The Problem of Rinderpest in India. J. T. Edwards. (Bul. 199. Imperial Inst. Agr. Res., Pusa, 1930.) Illustrated. pp. 16.

State Sanitary Requirements Governing Admission of Livestock. (Misc. Cir. 14. U. S. Dept. Agr., Washington, D. C., February, 1930.) pp. 108.

To Dr. and Mrs. M. LeRoy Sweigard, of Progress, Pa., a daughter, April 20, 1930.

Courtesy Union Pacific System

Terraces at Mammoth Hot Springs, Yellowstone Park

CHANGES RELATIVE TO VETERINARY OFFICERS

Regular Army

The promotion of Captain George W. Brower to the grade of major, effective March 8, 1930, is announced.

Captain Thomas A. Breen, having been found by an Army retiring board incapacitated for active service on account of disability incident thereto, and such finding having been approved by the President, the retirement of Captain Breen from active service, effective March 18, 1930, is announced.

Captain Arthur D. Martin has been assigned to Fort Myer, Va., for temporary duty for a period of approximately five months, effective March 26, 1930.

Veterinary Reserve Corps

New Acceptances

Marsh, Hadleigh	Major	Agricultural Experiment Station, Bozeman, Mont.
Bouton, Jay Henry	Capt.	9357 E. Colfax Ave., Aurora, Colo.
Hatchett, Guy P.	Capt.	1025 McCallie Ave., Chattanooga, Tenn.
Frieze, Harry Lee	2nd Lt.	517 S. Perry Street, Gaffney, S. C.
Massinger, C. E.	2nd Lt.	805 Main St., Phoenixville, Pa.

Promotions

Campbell, Delwin Morton	to Lt. Col.	180 N. Michigan Ave., Chicago, Ill.
Nelson, Chester Lee	to Major	Kiowa, Colo.
Brady, Ezra M.	to Captain	Red Oak, Iowa.
Bryan, Arthur Herbert	to Captain	4400 Raspe Ave., Baltimore, Md.
Hogg, James Seely	to Captain	20 Darling St., Wilkes Barre, Pa.
Lashbrook, W. G.	to Captain	Owensboro Road, Rockport, Ind.
Norton, Robert S.	to Captain	Minot, N. D.

Examination for Veterinary Corps

Examination for the purpose of qualifying candidates for appointment in the Veterinary Corps, Regular Army, will be held within the continental limits of the United States, June 23 to 28, 1930, inclusive.

Application blanks, Form No. 62, A. G. O., may be obtained from The Adjutant General or The Surgeon General, U. S. Army, Washington, D. C., or from the Commanding Officer or Surgeon of any military post or station, and when completed should be forwarded direct to The Adjutant General, U. S. Army, Washington, D. C.

The applicant must be a male citizen of the United States between the ages of 21 and 29 9-12 years, and a graduate of a recognized veterinary college.

At the present time there are sufficient vacancies in the Veterinary Corps to make it probable that all candidates who successfully pass the examination will be commissioned without delay.

BUREAU TRANSFERS

Dr. P. A. Franzmann (Cin. '09) from Great Falls, Mont., to Miles City, Mont., on meat inspection.

Dr. C. L. Elliott (Iowa '02) from Mason City, Iowa, to Newark, N. J., in charge of meat inspection.

Dr. O. W. Seher (Colo. '13) from Atlanta, Ga., to Mason City, Iowa, in charge of meat inspection.

Dr. J. H. Shoemaker (Ind. '18) from Great Falls, Mont., to Helena, Mont.

Dr. C. D. Stein (U. P. '11) from virus-serum inspection at Pearl River, N. Y., to the B. A. I. Experiment Station, Bethesda, Md.

Dr. M. J. Kemen (Chi. '16) from Lansing, Mich., to Albany, N. Y., on tuberculosis eradication. (Stationed at Waterford, N. Y.)

Dr. Robert H. Nutt (O. S. U. '09) from Henderson, Ky., to Birmingham, Ala., in charge of meat inspection.

Dr. J. L. Burgett (K. C. V. C. '01) from Morristown, Tenn., to Henderson, Ky., in charge of meat inspection.

Dr. Geo. W. Trubey (Mich. '19) from Lansing, Mich., on tuberculosis eradication, to Detroit, Mich., on meat inspection.

Dr. Edward E. Maas (K. C. V. C. '17) from Jackson, Miss., to Fort Worth, Texas, on tick eradication. (Stationed at Rusk, Texas.)

Dr. Paul E. Nulk (O. S. U. '12) from Whitehall, Ill., to Kansas City, Kans., on virus-serum inspection.

Dr. Charles Walter (T. H. '15) from Zionsville, Ind., to Whitehall, Ill., on virus-serum inspection.

Dr. W. L. Davis (K. C. V. C. '10) from Little Rock, Ark., to Pine Bluff, Ark., on tick eradication.

Dr. A. J. Matter (O. S. U. '16) from Williston, N. Dak., to Des Moines, Iowa, on tuberculosis eradication.

Dr. J. L. Orr (A. P. I. '23) from Springfield, Mass., to Hyde Park, Vt., in charge of meat inspection.

Dr. F. E. Rambo (Ind. '11) from Jackson, Miss., to Jacksonville, Fla., on tick eradication. (Stationed at Bunnell, Fla.)

Dr. George McCollister (O. S. U. '13) from Oklahoma City, Okla., to Los Angeles, Calif., on field inspection.

Editorial Reproduced

The editorial, "Interest in Poultry Diseases Increases," published in the November, 1929, issue of the JOURNAL, was reproduced in full in the December issue of the *International Review of Poultry Science*, edited by Dr. B. J. C. te Hennepe, of Rotterdam, Holland.

COMMUNICATIONS

FAVORS INCREASED DUES

To the Editor:

I would like to say that I am very much in favor of an increased membership fee for the A. V. M. A. There is no other profession the work of which is so little understood by the public. The fact that newspaper editors and reporters still call us "horse doctors" indicates the amount of training they think we get. I believe that a very small percentage of the people suspect that our colleges give us practically the same training given to a Doctor of Medicine. That is why a county agent who has had a one-semester lecture course in diseases of farm animals can throw his chest out and pose as a veterinarian. Many of them do this too, to the detriment of both the profession and the farmer. This is one thing which I think the Association should look into thoroughly. The U. S. Department of Agriculture is not helping the farmer when it gives him free service of this kind and in many cases it has been the cause of practitioners quitting their practices. I predict a time when many communities will wish they had their veterinarians back instead of the county agent.

Every now and then, we see an article in our professional journals mentioning "flu" of swine and other ailments, using similar terms. I have often wondered why, if swine have influenza, a professional man cannot call it such instead of "flu" like a county agent or a "hawss doctor."

C. O. Williamson.

Butte, Montana, February 3, 1930.

REPORTS APPRECIATED

To the Editor:

The accounts of the activities of the various associations, as published in your Journal, are greatly appreciated by the various members of our profession in this part of the Province, as it assists in keeping us in contact with what the various associations are doing and to some extent about what the profession is thinking.

Chas A. Mitchell.

Hull, Que., February 5, 1930.

TABANIDAE AND SURRA

TO THE EDITOR:

In the February, 1930, issue of the JOURNAL, Dr. H. M. Martin, in an article entitled, "The Transmission of Surra by Species of Tabanus—A Historical Review," discusses a published statement of Col. W. George Turner on a report of surra investigations by the undersigned and states that Col. Turner in his article disregarded earlier meritorious work. As the discussion centers around my investigations and as neither the article by Col. Turner nor that by Dr. Martin makes it clear that in my own report, published in the *Philippine Journal of Science* and which only a few readers of the JOURNAL may have seen, I fully credited previous workers for their contributions, I desire to record the following facts.

In my article on surra transmission, appearing in the October, 1927, issue of the *Philippine Journal of Science*, the literature was reviewed and full credit given various investigators, including Mitzmain, for previous work. No claim whatever was made for priority in demonstrating experimentally that *Tabanus striatus* was capable of transmitting surra. Some of the earlier work, including that of Mitzmain, was of the highest order, was carried out under most exacting conditions and constitutes valuable scientific knowledge. I would be the last to want to detract from it in any way.

I indicated in my report in 1927, and restate it now, that a review of all of the literature (not that regarding Tabanidae alone) on the subject of surra transmission reveals great disagreement and uncertainty as to the precise way surra is transmitted *naturally*. I found this condition prevailing in the Philippines upon my arrival there in 1925, and it was because of such fact that I undertook a study of the problem. My results were confirmatory of those of Mitzmain and others who concluded that Tabanidae were the important flies in surra transmission. In addition to experimental transmission tests, I was fortunate in having an opportunity to study epizoologically, under the most satisfactory conditions, a large outbreak of the disease among Army animals and obtained convincing substantiating evidence of the role of Tabanidae in the spread of surra. In this latter respect, particularly, I hoped that my findings might add a little more evidence to the subject and might possibly help serve to bring about a more general acceptance that, in the Philippines,

Tabanus striatus is the common vector of surra and that the infection is transmitted in a purely mechanical way.

R. A. KELSER.

Washington, D. C., March 8, 1930.

NEPHRITIS IN DOGS

TO THE EDITOR:

I want to congratulate Doctor Perrin, as author, and our own good JOURNAL, as publishers, of the most outstanding article on small-animal practice which has appeared during the past year. Nephritis is not a rare disease in small-animal practice, neither is it a disease limited to middle or old age, but will be met with in the young dog of a few months of age now and then. The practitioner who studies his cases closely will make fewer diagnoses of gastro-enteritis and more of nephritis.

FREDERICK R. WHIPPLE.

Chicago, Ill., April 7, 1930.

Bulletin on Johne's Disease

The presence of Johne's disease in cattle in many sections of the United States gives rise to the belief that the infection exists to some degree in virtually every state. This disease, also known as paratuberculosis, is an incurable, infectious, bacterial dysentery which affects cattle principally, but may also affect horses, sheep, deer and goats. The infection is thought to have been introduced into the United States originally in shipments of cattle from Europe. Its seriousness, whenever it occurs among cattle, is such that reactors to the johnin test are slaughtered and indemnities paid. The disease is more fully described in Circular 104-C, "Johne's Disease (Paratuberculosis) of Livestock," just issued by the Bureau of Animal Industry, U. S. Department of Agriculture.

Indemnity funds have been available since July 1, 1927, when Congress granted to the Bureau of Animal Industry authority to pay indemnities to cattle-owners for animals slaughtered as reactors to the johnin test. These payments are made on the same basis as are the indemnities paid on reactors to the tuberculin test. Further details concerning the payment of indemnity may be obtained by writing to the proper state live stock sanitary officials, or to the Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

AMERICAN VETERINARY MEDICAL ASSOCIATION

Financial Report—Dr. M. Jacob, Treasurer
December, 31, 1929

Bank balances, December 31, 1928		$ 5,706.86
Receipts, January 1, 1929, to December 31, 1929, (as per statement)		36,334.10
		$42,040.96
Expenditures, same period, as per statement		35,349.28
		$ 6,691.68
Less loan to Salmon Memorial Fund		150.00
		$ 6,541.68
Placed on time deposit—Journal Fund	$ 5,341.07	
Withdrew from time deposit—A. V. M. A. Fund	3,229.35	
		2,111.72
Amount of cash in checking accounts, December 31, 1929		$ 4,429.96
Revolving fund in hands of Dr. Hoskins		500.00
Amount of cash exclusive of time desposits		$ 4,929.96
Cash on time deposit, December 31, 1928	$20,682.66	
Added during period (as shown above)	2,111.72	
		22,794.38
Total cash resources		$27,724.34
Loan to Salmon Memorial Fund		150.00
Bonds (purchase price)		15,330.95
Total assets, December 31, 1929		$43,205.29
Total assets, December 31, 1928		42,220.47
Increase for period		$ 984.82

DISTRIBUTION OF ASSETS

Fund	Cash	Bonds (Cost)	Time Deposit	Totals
A. V. M. A.	$ 1,995.63	$ 5,821.94		$ 7,817.57
Journal	2,934.33	9,509.01	$22,794.38	35,237.72
Totals	$ 4,929.96	$15,330.95	$22,794.38	$43,055.29
Loan to Salmon Memorial Fund from A. V. M. A. Fund				150.00
				$43,205.29

A. V. M. A. FUND

Bank balance, December 31, 1928	$ 3,030.17	
Less old checks cashed	254.47	
		$ 2,775.70
Revolving fund in hands of Dr. Hoskins (see 1928 report)		500.00
Receipts during period (as per statement)		8,893.65
Total		$12,169.35

Expenditures during period (as per statement)	$11,253.07	
Loan to Salmon Memorial Fund	150.00	
		11,403.07
Balance		$ 766.28
Withdrew from time deposit		3,229.35
Total		$ 3,995.63
Paid loan to Journal Fund (see 1928 report)		2,000.00
Balance		$ 1,995.63
Revolving fund in hands of Dr. Hoskins		500.00
Balance		$ 1,495.63
Actual bank balance, December 31, 1929	$ 1,839.25	
Less checks not cashed	343.62	
Balance	$ 1,495.63	

JOURNAL FUND

Bank balance, December 31, 1928	$ 3,625.13	
Less old checks cashed	693.97	
		$ 2,931.16
Receipts during period (as per statement)		27,440.45
Total		$30,371.61
Expenditures during period (as per statement)		24,096.21
Balance		$ 6,275.40
Placed on time deposit		5,341.07
Balance		$ 934.33
Loan paid by A. V. M. A. Fund to Journal Fund		2,000.00
Total		$ 2,934.33
Actual bank balance, December 31, 1929	$ 3,564.33	
Less checks not cashed	630.00	
Balance	$ 2,934.33	

SALMON MEMORIAL FUND

Amount invested in 1st mortgage bonds		$ 5,500.00
Amount invested in U. S. Government bonds (face value)		500.00
Amount on time deposit		163.52
Total		$ 6,163.52
Receipts:		
Interest on 1st mortgage bonds	$ 302.50	
Interest on government bond	21.25	
Interest on time deposit	12.43	
		336.18
Total		$ 6,499.70
Less check to Erle R. Carter, February 14, 1929		150.00
*Balance, December 31, 1929		$ 6,349.70
Invested as follows:		
Fidelity Trust Co., 1st Mortgage Bonds	$ 5,500.00	
U. S. Liberty Bonds (face value)	500.00	
Amount on time deposit	349.70	
Total	$ 6,349.70	

*Salmon Memorial Fund owes A. V. M. A. Fund $150.00 for check to Erle R. Carter, September 16, 1929.

Bond Recapitulation

Fund	Par	Cost
A. V. M. A.	$ 6,000.00	$ 5,821.94
Journal	10,000.00	9,509.01
	$16,000.00	$15,330.95

Receipts from Secretary

Monthly Receipts—Dr. H. P. Hoskins (A. V. M. A. and Journal Funds)

1929	
Jan. 17	$ 6,374.93
Feb. 16	4,346.96
Mar. 16	4,121.40
Apr. 18	2,213.67
May 17	3,987.17
June 19	2,851.20
July 17	2,398.64
Aug. 24	2,173.21
Sept. 19	1,933.30
Oct. 17	1,405.53
Nov. 18	1,255.11
Dec. 18	1,374.10

Interest

May 14	Time deposits—Journal Fund	$ 61.39
July 22	Bonds—A. V. M. A. Fund	191.84
July 22	Bonds—Journal Fund	191.84
July 22	Time deposits—Journal Fund	467.40
July 22	Time deposits—A. V. M. A. Fund	116.93
Nov. 27	Time deposits—Journal Fund	42.22
Nov. 27	Time deposits—A. V. M. A. Fund	25.61
Dec. 31	Time deposits—A. V. M. A. Fund	44.16
Dec. 31	Time deposits—Journal Fund	257.00
Dec. 31	Time deposits—Journal Fund	116.67
Dec. 31	Bonds—Journal Fund	191.91
Dec. 31	Bonds—A. V. M. A. Fund	191.91
	Total Receipts	$36,334.10

Disbursements

January 1 to December 31, 1929

A. V. M. A. Fund

1929			
January	9	Dr. M. J. Harkins, traveling expenses	$ 118.84
January	9	DeWitt M. Shepard, Treasurer's bond	175.00
January	9	Dr. H. E. Bemis, traveling expenses	84.82
January	9	Dr. E. R. Steel, traveling expenses	56.98
January	9	Dr. E. A. Benbrook, traveling expenses	35.08
January	22	Book Bldg., Inc., rent for January	223.00
January	22	Friesema Bros. Printing Co., membership directories	475.00
January	22	Lyford M. Moore, Secretary's bond	25.00
January	22	H. Preston Hoskins, postage on directory	53.28
January	22	Dr. R. S. MacKellar, traveling expenses	127.20
January	22	Dr. T. E. Munce, traveling expenses	42.40
January	22	H. Preston Hoskins, miscellaneous	56.35
January	22	Horse Association of America, dues	50.00
January	30	H. Preston Hoskins, pay roll for January	516.67
January	30	Underwood Typewriter Co., typewriter	107.50
January	30	Dr. T. E. Munce, traveling expenses	200.73
February	14	Schiffer Printing Co., stationery	21.65
February	14	Dr. T. E. Munce, traveling expenses	128.12
February	14	Ed. S. Houck, depository bond	125.00

February	14	T. A. Falconnier, preparing Treasurer's report	20.00
February	14	A. H. Dondero, Inc., 1929 Hoskins Memorial medal	23.50
February	27	The Wolf Detroit Envelope Co., envelopes	16.25
February	27	H. Preston Hoskins, pay roll for February	100.00
February	27	Dr. T. E. Munce, traveling expenses	82.96
March	18	Book Bldg., Inc., rent for March	223.00
March	18	K. C. V. C. Alumni Association, advertising	10.00
March	18	Dr. H. D. Bergman, traveling expenses	53.05
March	30	H. Preston Hoskins, miscellaneous	23.10
March	30	H. Preston Hoskins, pay roll for March	516.67
April	8	H. Preston Hoskins, postage	50.15
April	17	Dr. T. E. Munce, traveling expenses	6.94
April	17	Maul-Nachtigal Co., book case	40.00
May	2	The American Multigraph Sales Co., supply contract	25.00
May	2	H. Preston Hoskins, pay roll for April	160.00
May	2	H. Preston Hoskins, postage	50.15
May	18	Schiffer Printing Co., stationery	46.50
May	18	Book Bldg., Inc., rent for May	223.00
May	18	H. Preston Hoskins, miscellaneous	39.08
May	24	H. Preston Hoskins, pay roll for May	596.67
May	29	Dr. H. J. Milks, traveling expenses	37.88
May	25	Dr. F. H. Brown, traveling expenses	27.16
May	25	Dr. W. A. Hagan, traveling expenses	37.88
May	25	Dr. B. Scott Fritz, traveling expenses	36.41
June	1	Dr. R. O. Biltz, traveling expenses	35.93
June	1	K. C. V. C. Alumni Association, advertising	10.00
June	11	Schiffer Printing Co., stationery	64.00
June	20	H. Preston Hoskins, miscellaneous	15.14
June	20	H. Preston Hoskins, postage	40.12
June	28	H. Preston Hoskins, pay roll for June	163.33
July	16	Book Bldg., Inc., rent for July	223.00
July	16	Schiffer Printing Co., stationery	21.95
July	16	H. Preston Hoskins, traveling expenses	30.55
July	22	H. Preston Hoskins, miscellaneous	23.67
July	29	H. Preston Hoskins, pay roll for July	601.67
August	29	Dr. T. E. Munce, traveling expenses	187.63
August	29	Friesema Bros. Printing Co., programs	58.75
August	29	Milo Art Studio, ballot-box, easels, etc	45.00
August	29	Dr. A. R. Anderson, refund membership fee	6.16
August	29	Schiffer Printing Co., stationery	33.00
August	29	Dr. T. E. Munce, traveling expenses	66.92
August	29	H. Preston Hoskins, pay roll for August	210.00
August	29	Dr. H. E. Bemis, traveling espenses	70.35
August	29	Burroughs Adding Machine Co., adding machine	197.10
September	12	Dr. E. P. Althouse, traveling expenses	54.16
September	12	Donelson, Connolly, Whitman & House, reporting meeting	294.00
September	12	H. Preston Hoskins, postage	30.09
September	16	Book Bldg., Inc., rent for September	223.00
September	16	The Master Reporting Co., Inc., reporting meeting	231.90
September	16	Dr. T. E. Munce, traveling expenses	9.98
September	16	Journal of the A. V. M. A., subscriptions for honorary members	114.00
September	16	K. C. V. C. Alumni Association, advertising	10.00
September	16	Dr. H. D. Bergman, traveling expenses	35.79
September	26	Dr. M. Jacob, traveling expenses	63.81
September	26	H. Preston Hoskins, miscellaneous	29.93
September	26	H. Preston Hoskins, pay roll for September	626.67
October	14	T. A. Falconnier, preparing Treasurer's report	5.00
October	14	Friesema Bros. Printing Co., reprints	65.00
October	14	Schiffer Printing Co., stationery	28.25
October	14	Dr. E. R. Steel, traveling expenses	66.30

October	14	Dr. Malcolm J. Harkins, traveling expenses	59.22
October	14	H. Preston Hoskins, postage	100.30
October	14	H. Preston Hoskins, traveling expenses	33.30
November	1	Dr. R. S. MacKellar, traveling expenses	87.66
November	1	H. Preston Hoskins, pay roll for October	210.00
November	15	H. Preston Hoskins, traveling expenses	38.18
November	15	Dr. T. H. Ferguson, traveling expenses	32.70
November	15	Book Bldg., Inc., rent for November	223.00
November	15	Wolf Detroit Envelope Co., envelopes	42.08
November	15	H. Preston Hoskins, miscellaneous	21.35
November	15	Jewel Emblem Mfg. Co., radiator emblems	183.75
November	27	H. Preston Hoskins, traveling expenses	14.57
November	27	H. Preston Hoskins, pay roll for November	626.67
December	12	H. Preston Hoskins, postage	100.30
December	12	Schiffer Printing Co., stationery	30.00
December	17	K. C. V. C. Alumni Association, advertising	10.00
December	17	H. Preston Hoskins, traveling expenses	41.97
December	17	Dr. E. P. Althouse, traveling expenses	77.42
December	17	Dr. Geo. F. Jungerman, refund fee	4.08
December	27	Dr. H. D. Bergman, traveling expenses	46.20
December	27	H. Preston Hoskins, pay roll for December	210.00
Total			$11,253.07

Disbursements

January 1 to December 31, 1929

Journal Fund

January	9	Friesema Bros. Printing Co., reprints	120.20
January	9	H. Preston Hoskins, old journals	28.25
January	21	Wolf Detroit Envelope Co., Journal envelopes	153.40
January	22	Friesema Bros. Printing Co., printing January Journal	1,040.00
January	22	H. Preston Hoskins, miscellaneous	119.50
January	22	H. Preston Hoskins, postage on January Journal	46.73
January	30	H. Preston Hoskins, pay roll for January	130.00
February	14	Book Bldg., Inc., rent for February	223.00
February	14	Friesema Bros. Printing Co., reprints	27.54
February	14	H. Preston Hoskins, miscellaneous	58.64
February	27	Friesema Bros. Printing Co., printing February Journal	1,040.62
February	27	H. Preston Hoskins, postage on February Journal	55.85
February	27	H. Preston Hoskins, pay roll for February	630.00
March	18	Friesema Bros. Printing Co., reprints	59.84
March	30	H. Preston Hoskins, postage on March Journal	81.16
March	30	H. Preston Hoskins, pay roll for March	130.00
April	8	Friesema Bros. Printing Co., printing March Journal	2,043.75
April	8	H. Preston Hoskins, old journals	52.55
April	8	Friesema Bros. Printing Co., reprints	352.88
April	8	Book Bldg., Inc., rent for April	223.00
April	17	Friesema Bros. Printing Co., printing April Journal	1,052.12
April	17	H. Preston Hoskins, postage on April Journal	46.52
April	17	Barrett Bindery, binders for Journal, etc	301.55
May	2	Maul-Nachtigal Co., file	61.80
May	2	H. Preston Hoskins, pay roll for April	630.00
May	2	Friesema Bros. Printing Co., reprints	94.52
May	18	H. Preston Hoskins, miscellaneous	90.59
May	18	Friesema Bros. Printing Co., printing May Journal	1,040.00
May	18	H. Preston Hoskins, postage on May Journal	69.63
May	24	H. Preston Hoskins, pay roll for May	130.00
June	11	Book Bldg., Inc., rent for June	223.00
June	11	H. Preston Hoskins, miscellaneous	69.28

June	11	Friesema Bros. Printing Co., reprints	153.51
June	20	Friesema Bros. Printing Co., printing June Journal	1,075.00
June	20	H. Preston Hoskins, postage on June Journal	50.44
June	28	Friesema Bros. Printing Co., reprints	71.61
June	28	H. Preston Hoskins, miscellaneous	168.56
June	28	H. Preston Hoskins, pay roll for June	630.00
July	16	H. Preston Hoskins, old journals	44.85
July	22	Friesema Bros. Printing Co., printing July Journal	1,081.87
July	22	H. Preston Hoskins, postage on July Journal	81.52
Jult	22	Friesema Bros. Printing Co., reprints	75.28
July	29	H. Preston Hoskins, pay roll for July	130.00
August	7	Book Bldg., Inc., rent for August	223.00
August	8	Friesema Bros. Printing Co., reprints	50.20
August	8	H. Preston Hoskins, miscellaneous	108.73
August	29	H. Preston Hoskins, postage on August Journal	62.40
August	29	H. Preston Hoskins, pay roll for August	630.00
September	12	American Commercial Photo Co., photographs of meeting	56.60
S?ptember	12	Friesema Bros. Printing Co., reprints	83.75
September	16	H. Preston Hoskins, miscellaneous	170.08
September	16	Friesema Bros. Printing Co., printing September Journal	1,087.50
Septebmer	16	H. Preston Hoskins, postage on September Journal	46.23
September	16	Friesema Bros. Printing Co., printing August Journal	1,085.00
September	26	H. Preston Hoskins, pay roll for September	130.00
October	1	Book Bldg., Inc., rent for October	223.00
October	23	Friesema Bros. Printing Co., printing October Journal	1,089.50
October	23	H. Preston Hoskins, postage on October Journal	70.77
October	23	Friesema Bros. Printing Co., reprints	62.64
November	1	H. Preston Hoskins, miscellaneous	51.84
November	1	H. Preston Hoskins, pay roll for October	630.00
November	15	Friesema Bros. Printing Co., reprints	25.72
November	15	Friesema Bros. Printing Co., printing November Journal	1,093.87
November	15	H. Preston Hoskins, postage on November Journal	47.73
November	15	H. Preston Hoskins, miscellaneous	70.74
November	15	Wolf Detroit Envelope Co., envelopes	155.33
November	27	Friesema Bros. Printing Co., reprints	177.23
November	27	H. Preston Hoskins, pay roll for November	130.00
December	17	Book Bldg., Inc., rent for December	223.00
December	12	Barrett Bindery Co., binders for Journal	509.08
December	27	Friesema Bros. Printing Co., printing December Journal	1,095.50
December	17	H. Preston Hoskins, postage on December Journal	67.59
December	17	H. Preston Hoskins, miscellaneous	80.62
December	27	H. Preston Hoskins, pay roll for December	630.00
Total			$24,096.21

Gratis Visas for Delegates

Dr. Fred Bullock, General Secretary, Eleventh International Veterinary Congress, has announced that the British Government has given instructions to all H. M. consular and passport control officers, authorizing the grant of gratis visas to all foreign delegates attending the Congress in London, August 4-9, 1930. This will mean a saving of ten dollars to each member, Dr. Adolph Eichhorn advises.

FLORIDA STATE VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Florida State Veterinary Medical Association was held at the Hotel Marion, Ocala, December 16-17, 1929, with thirty-nine members present.

The Association was welcomed to Ocala by Dr. E. G. Peck, Mayor, who was presented by Dr. H. C. Nichols, of Ocala. The response was made by Dr. John Wells, of West Palm Beach. Dr. E. L. Reed, of Pensacola, in his presidential address reviewed the activities of the Association during the past year and directed attention to the fact that this meeting was especially well attended notwithstanding the general financial depression.

Dr. E. M. Nighbert, of the U. S. Bureau of Animal Industry, Moultrie, Ga., presented a paper, entitled, "The Veterinarian's Responsibility in Developing the Live Stock Industry of Florida." In connection with his paper, Dr. Nighbert performed some very interesting autopsies on a number of pigs and demonstrated several varieties of internal parasites. He offered many practical suggestions regarding the sanitary handling of swine to prevent parasitisms.

Dr. S. C. Smith, of Lake City, related his experiences as a member of the House of Representatives in the Florida Legislature. At the afternoon session of the first day, Dr. A. L. Shealy, University of Florida, Gainesville, presented a very practical paper, "The Relation of Human and Animal Brucelliasis." Dr. J. V. Knapp, State Veterinarian, of Tallahassee, presented for consideration by the Association, "The Florida Plan for the Control of Bang's Disease (Infectious Abortion)." Following the reading of Dr. Knapp's paper, a motion prevailed approving the plan submitted.

Dr. E. L. Thomas, University of Florida, Gainesville, presented a paper, entitled, "Some Observations of *Filaria Immitis*." This was followed by a paper, entitled, "Hematozoa of Animals and

Their Control," by Dr. A. D. Knowles, of Kelsey City. A lengthy discussion followed the reading of these papers.

The Association then went into executive session and acted upon a number of resolutions. Eleven veterinarians were admitted to active membership in the Association. Dr. E. M. Nighbert was elected as honorary member.

On the morning of the second day, Dr. T. W. Cole, U. S. B. A. I., Jacksonville, presented a paper, entitled, "The Importance of the Control of Foot-and-Mouth Disease."

The election of officers resulted as follows: President, Dr. John Wells, West Palm Beach; vice-president, Dr. H. C. Nichols, Ocala; secretary-treasurer, Dr. J. V. Knapp, Tallahassee.

It was decided to incorporate the Association, after thoroughly considering the matter. It was decided that the annual meeting of the Association be held some time during the first two weeks in November. The question of having the Constitution and By-laws printed was referred to the Executive Committee. Later a motion prevailed to appoint a committee to revise the Constitution and By-laws in order to meet the requirements of an incorporated body.

The financial statement showed a balance of $269.82 in the treasury.

J. V. KNAPP, *Secretary-Treasurer.*

CALIFORNIA VETERINARY CONFERENCE

The annual California Veterinary Conference was held at University Farm, Davis, January 6-10, 1930.

The program was opened by Dr. L. R. Vawter, of Reno, Nevada, who gave an illustrated lecture on "Range Plants Poisonous to Sheep."

Dr. H. E. Bemis, of the University of Pennsylvania, delivered six lectures during the conference. The subjects of the lectures were as follows:

Diseases of the Feet of Cattle and Demonstration of Clinical Operations.
Prevention and Treatment of Sterility in Large Animals.
Veterinary Schools in Europe (Illustrated).
Surgery of the Mammary Organs.
Castration and Its Complications, Including Cryptorchidy and Hernia Operations.
Technic of Local Anesthesia from Infiltrations and Regional Blocking in Horses, Cattle, Sheep, Swine and Dogs.

The balance of the program was contributed by veterinarians of California, members of the faculty of the College of Agricul-

ture, and physicians from the Woodland Clinic of the University of California.

Among the very instructive features of the conference, especially from the standpoint of the small-animal practitioner, were the surgical demonstrations by a team of six surgeons from the University of California. In order that the veterinarians could view the demonstrations those present were divided into three groups. The surgical operations were then performed by the surgeons, each one having an assistant. As three different periods for these demonstrations were used, each group of men saw the operations performed by a different surgeon each time.

The operations were performed on the stomach, intestines and bladder, primarily with the intention of showing the veterinarians the proper method of handling, stitching, and so forth, when operating on the hollow organs of small animals.

The California State Veterinary Medical Association held two business meetings during the course of the conference, most of the time being spent in discussing plans for entertaining the A. V. M. A. in Los Angeles next August.

Due to the fact that the national meeting will be held in Los Angeles, in August, 1930, it was voted to hold only a business meeting of the State Association in June, this meeting to be held in Los Angeles, June 19.

W. L. Curtis, *Secretary.*

NEVADA STATE VETERINARY ASSOCIATION

The annual meeting of the Nevada State Veterinary Association was held at the University of Nevada, Reno, January 22, 1930. Dr. G. T. Woodward, of Fallon, presided. Roll call showed fourteen members and four visitors present. The fourteen members represented 100 per cent of the active membership of the Association.

Dr. L. R. Vawter, of Reno, gave a report covering the proceedings of the fourth annual Conference of Accredited Delegates from State, Territorial and Provincial Veterinary Association held at Detroit, Mich., August 12, 1929. At the conclusion of his report, Dr. Vawter recommended that the Association cooperate with the American Veterinary Medical Association in any feasible plan which might be proposed by the latter for closer coordination between it and the various state, territorial and provincial associations.

The following program was presented during the afternoon and evening sessions:

"The Dourine Situation in Nevada," Dr. L. C. Butterfield.
"Recent Developments in Brucellosis," Dr. Edward Records and Dr. Lyman R. Vawter.
"A Proposed Nevada Plan for Contagious Abortion Control," Dr. Warren B. Earl.
"Malignant Edema in Sheep—Case Report," Dr. K. W. Niemann.
"Possible Necrophorus Infection in Man—Case Report," Dr. W. H. Hilts.
"Liver Flukes in Sheep, Cattle and Goats." Motion picture from Oregon State Agricultural College.
"The Liver Fluke in Sheep," Dr. Robert Dill.
"How to Handle Foxes." Motion picture from U. S. Bureau of Biological Survey.
"The Legal Status of the Fox Industry in Nevada," Dr. Edward Records.
"Urinary Calculi in a Fox—Case Report," Dr. Lyman R. Vawter.
"A Study of Fox Encephalitis." Motion picture from U. S. Bureau of Biological Survey.
"Parasitism in Foxes—Case Report," Dr. F. E. Henderson.
"Health for Hogs." Motion picture from U. S. Bureau of Animal Industry.
"Exit Ascaris." Motion picture from U. S. Bureau of Animal Industry.
"An Undiagnosed Condition in Hogs—Case Report," Dr. F. H. Baker.
"An Undiagnosed Condition in Cattle—Case Report," Dr. H. A. Reagor.
"T.B. or Not T.B." Motion picture from U. S. Bureau of Animal Industry.

Drs. F. E. Henderson, of Elko, and K. W. Niemann, of Reno, were elected to active membership. The election of officers resulted as follows: President, Dr. H. A. Reagor, Reno; vice-president, Dr. Robert Dill, Reno; secretary-treasurer, Dr. Edward Records, Reno.

EDWARD RECORDS, *Secretary.*

CENTRAL CANADA VETERINARY ASSOCIATION

The annual meeting of the Central Canada Veterinary Association was held in the Chateau Laurier Hotel, Ottawa, on January 22, 1930.

Approximately one hundred members and visitors were present. In the morning a business meeting was held and officers elected, Dr. C. M. Higginson being elected President for a second term. Reports indicated that the Association is in a very healthy condition, its members and finances increasing from year to year.

In the afternoon the scientific program was held and was opened with a paper on "Mastitis," by Dr. E. Johnston, of Carp. This excellent paper presented many of the practical sides of the problem under discussion and was a very useful address to practitioners and sanitarians alike. Dr. Johnston emphasized the fact that the veterinarian not only was responsible to his client for the treatment of the ill animal, but he was responsible

also to the public at large for the control of the milk from the ailing animal.

The second address was one of the most interesting to which the Association has been privileged to listen. Dr. M. C. Baker, formerly professor of comparative anatomy at the McGill Faculty of Comparative Medicine, spoke on "Sir William Osler and His Connection with Comparative Medicine." Dr. Baker took considerable of his early training under Sir William (then Dr. Osler) and many were the reminiscences of the pupil relative to the teacher. No one could fail to appreciate the intense interest that Sir William took in comparative medicine after listening to Dr. Baker's address.

"Consideration of Some Public Health Factors in the Practice of Comparative Medicine" was the title of a most excellent address by Dr. Norman McLeod Harris, Director of Laboratory of Hygiene, Department of Health, Ottawa. In this address Dr. Harris emphasized the close connection that existed between human and comparative medicine and he deplored the tendency of some of the veterinary faculties to divorce themselves from their connection with human medicine and affiliate themselves with agriculture. Dr. Harris pointed out that, from the standpoint of public health, comparative medicine had very definite responsibilities. Dr. Harris' paper is being published and will be available to the members.

"Nutritional Anemia of Suckling Pigs" was the subject of a paper by Dr. F. W. Schofield, of the Ontario Veterinary College. Few lecturers are more popular with their audiences than Dr. Schofield and not only was the investigational work on this interesting subject presented in an exhaustive manner but it was presented in that entertaining way of which Dr. Schofield is master.

"Rabies and Its Control" was the title of a paper presented by Dr. George Hilton, Veterinary Director General of Canada. Dr. Hilton emphasized that the control of rabies in Canada was largely dependent upon the control of the dog and that in those localities where rabies occurred its control is largely dependent upon the vigor with which the municipal authorities control the dog. Dr. Hilton showed two excellent moving pictures on rabies; first, "Rabies in Domestic Animals," a film supplied by the University of Colorado, and, secondly, "Rabies in Man," a film supplied by the University of Chicago.

In the evening a banquet was held in the Quebec suite of the Chateau Laurier. Dr. John Amyot, C. M. G., Deputy Minister of Health for Canada, was guest of honor. Among the visitors were Dr. C. D. MacGillvray, Principal of the Ontario Veterinary College; Dr. Etienne, representing the Quebec Veterinary Association; Dr. Patterson, representing the Ottawa Medical Society; Dr. Lett, of the Ontario Department of Health; and many others.

CHAS. A. MITCHELL

MICHIGAN STATE COLLEGE SHORT COURSE

Is the postgraduate short course idea growing? What of its future? Surely the answer will not be furnished by our experience, but our testimony is offered herewith at the veterinary "prayer meeting." Our seventh session, held at the College, January 27 to 31, 1930, was a success from whatever angle it may be or may have been viewed—and this is not to say that it did not fall far short of perfection. We shall not attempt to give the substance of the papers presented or a description of the demonstrations, since that could not be done in the space available; this is the time for diagnosis and a discussion of the case as revealed at the autopsy, and not a time for a full description of the pathology. The reader should study the article, "The Veterinary Conferences," in the February, 1930, issue of *The North American Veterinarian*. This will put him in the right mood for a philosophical consideration of the subject. The writer is so fully in accord with the sentiments recorded in the article referred to, that he almost expected to note his name attached as the author.

We, in Michigan, do not know the technic of preparing and conducting a postgraduate short course as yet, but we are learning and it is important that we do learn. We must not cheat the veterinarians of our state or our guests from distant places. We make no special effort to expect a large attendance but, in spite of our weather conditions and our crude methods, the local men came in numbers as large as we can accommodate and, this year, we enrolled from outside as follows: Canada, 1; Maine, 1; Illinois, 3; Ohio, 2; Indiana, 1.

To make postgraduate work worth while we must have good material to work with, that is to say, the men who present themselves for advanced instruction must bring with them the qualities—personal, intellectual, professional—that are obviously (or

are they obscure?) necessary if a school is to succeed. There must be a trained faculty, possessed of ideals for the profession and a zeal and judgment in selecting and presenting subject matter. There must be facilities for instruction, such as well-equipped laboratories and class-rooms, and clinical material.

We are impressed with the fact that there is room for improvement in respect of each of these requirements; but there is, also, a wealth of material available in each. The practitioners are certainly not the most to be condemned. They invest their time and money and give indication of a desire to keep themselves in position to serve their clientele so that neither "state medicine" nor "lay practice" shall become the alternative to an adequate veterinary service. There are exceptions and there are instances that come to the surface at a short course, that indicate a tendency to account for veterinary troubles by passing the buck from faculty to practitioner or to equipment or in the reverse direction.

We should have better faculties at our veterinary colleges and at those institutions that give any instruction or do research in veterinary science. The achievement of this desideratum is almost as difficult as lifting oneself by one's boot-straps. Can a poor faculty train a better faculty? Yes, that is the only way in which advancement has ever come. We must make the future out of the past and the present. But better veterinary faculties can be made by the outside assistance of the profession and the other sciences. We should have available a list of every practitioner and of every scientific scholar who is willing to assist in developing better undergraduate and postgraduate veterinary instruction. We are convinced that there is a wealth of material available outside of the veterinary faculties as they are now constituted and that this material should be made to and would be glad to help make veterinary service in America as nearly perfect as is humanly possible. We shall not waste words in defense of the presently constituted veterinary instructional, research and field forces in this country; they do not need defense but assistance and encouragement. Their attitude is one of humility, not pride.

That we have good men on our veterinary college faculties is evidenced by the return of our graduates and the graduates of other colleges to the short courses, by the requests for special instruction at other times, and by the interest that was manifest in the discussions by Dr. Robert Graham, veterinary teacher and investigator, at the University of Illinois. That scientists out-

side the profession can make a contribution was shown by the interest in the lecture and demonstration by Professor Roseboom, of the Department of Physiology, on the respiratory quotient and basal metabolism in the dog. That practitioners can really make a postgraduate program a success was proved by Dr. J. V. Lacroix, of Evanston, Illinois, who demonstrated not only a mastery of the clinical aspects of injuries, fractures and sprains in small animals but also the well-known fact that he is a congenial, scholarly gentleman; and by Dr. L. H. Smith of Mt. Clemens, who reported on progress in the elimination of reactors by frequent testing and isolation in a large dairy herd; and by the very fact that Dr. F. E. Stiles, of Battle Creek, was listed to discuss a practitioner's method of handling worms in sheep, although he was detained by the annoyance incident to the Pasteur treatment, the necessity for taking which he acquired in the "line of duty"; and by Dr. A. B. Curtice, of Hillsdale, whose impromptu discussion of brucelliasis precipitated a serum test of most of the veterinarians in attendance and an allergic test of the reactors.

As far as equipment is concerned, we can say only that the public will provide that in due season, if we will demonstrate our ability and willingness to use what we now have for the benefit of the public, and if we all, practitioners and faculties, can show that additional equipment is necessary, not for ourselves, but for the public itself.

WARD GILTNER

MISSOURI SPECIAL COURSE FOR GRADUATE VETERINARIANS

A Special Course for Graduate Veterinarians was held at Columbia, Mo., January 21-24, 1930, under the direction of the Department of Veterinary Science of the College of Agriculture, University of Missouri, in cooperation with the Missouri Veterinary Medical Association.

More than eighty graduate veterinarians attended. Extremely cold weather and heavy snows prevented many from being present. The cooperation between the Veterinary Department of the College of Agriculture and the State Association has afforded a means whereby Missouri veterinarians have had an opportunity to come together and enjoy the advantages of the college equipment and instruction staff assembled.

The program was started with the convocation and a few remarks by Dr. J. W. Connaway, chairman of the Veterinary Department. The discussions during the day dealt with swine problems. Prof. A. G. Hogan, professor of animal nutrition, talked on the nutrients required for the complete life cycle of the animal. Dr. H. E. Biester, of Iowa State College, presented the subject of infectious enteritis of swine. Dr. A. T. Kinsley, of Kansas City, talked on pulmonary infections of swine and conducted a round-table discussion of swine diseases. This was followed by autopsy demonstrations of lesions of the various diseases discussed. Dr. O. S. Crisler, superintendent of the College Serum Laboratories, furnished much of the material for the demonstrations. Several field cases were presented by practitioners. Dr. W. F. Guard, Ohio State University, demonstrated swine surgery.

Most of the evening session was devoted to an illustrated lecture on anaplasmosis in cattle, by Dr. G. W. Stiles, of the U. S. B. A. I. Several practitioners related their experiences with this disease.

The Wednesday sessions were devoted to cattle problems, except for a short talk by Dr. H. Preston Hoskins on the work of the American Veterinary Medical Association.

Prof. W. J. Regan, Extension Assistant in Dairy Husbandry, outlined dairy extension projects and their value to the profession. Dr. H. E. Biester gave an illustrated lecture on coccidiosis in cattle. Dr. W. F. Guard discussed the significance of inflammations, described special operative technic requested from the floor, and conducted various surgical demonstrations on the bovine. Dr. Guard was kept busy most of the day.

The evening session was devoted to discussions of undulant fever and rabies. All physicians in the territory about Columbia were invited and a great number attended. Dr. A. V. Hardy, of the Iowa State Board of Health, discussed, "Undulant Fever in the Human and Its Relation to the Bang Abortion Disease in Animals."

Dr. G. W. Stiles gave a talk on rabies in humans and animals, illustrated with moving pictures of clinical cases. Dr. M. P. Neal, chairman of the Department of Pathology, School of Medicine, University of Missouri, spoke on the pathology of rabies. A general discussion of each subject brought out many points of interest. Dr. Neal stressed the possibility of danger from the rabies "carrier."

The Thursday program opened with an illustrated lecture on diagnosis of parasitosis and a laboratory demonstration and study of parasite ova in feces of animals, by Dr. H. E. Biester.

Dr. A. J. Durant, of the Veterinary Department at the College, demonstrated a rapid technic for the diagnosis of rabies. Dr. W. F. Guard followed the dog clinic with several surgical cases on the horse.

The banquet has become one of the attractive features of the course. It was held Thursday evening at the Daniel Boone Tavern. Prof. Sam Shirky, Superintendent of Short Courses, outlined the scope of the University Short Courses. Dr. H. A. Wilson, state veterinarian of Missouri, and one of the biggest boosters for the profession, climaxed the after-dinner speeches with one of his best on "Optimism.". Many short toasts were offered and special mention should be made of the enthusiasm set forth by Dr. D. B. Morgan, of Neosho.

Friday was devoted to poultry problems. Dr. E. F. Sanders, serologist in the Veterinary Department of the University, gave an illustrated lecture on pullorum disease, its nature and eradication. Dr. Sanders also demonstrated the rapid agglutination test for abortion disease during the course. Prof. Berley Winton talked on the poultry development projects in Missouri.

Dr. O. T. Murphy, of Kahoka, who specializes in poultry practice, gave a short talk and demonstrated many points of value in poultry practice. Dr. A. J. Durant illustrated the diagnosis of the more common diseases of poultry, using specimens and slides.

A further laboratory demonstration of diseases of poultry, showing postmortem lesions and many clinical cases, was arranged. This was one of the most instructive demonstrations on the program. Dr. Andrew W. Uren, instructor in the College of Agriculture, procured most of the large-animal clinic and was "handy man" about the meeting.

J. D. RAY, *Secretary.*

ALABAMA VETERINARY SHORT COURSE

The seventh annual short course for graduate practicing veterinarians was held at the Veterinary College of the Alabama Polytechnic Institute, at Auburn, February 3-8, 1930.

Dr. T. H. Ferguson, president of the A. V. M. A., was kept very busy during the entire course. He talked chiefly on diseases

of cattle and covered diseases of the head, the digestive tract, and the generative organs. He also gave demonstration operations and talks on diseases of the feet of cattle. He did so many clinical and surgical operations on cattle, horses, mules and sheep that it would take too much space to write of each one. Some of the outstanding ones may be of interest to the profession. Very delicate and accurate operations were done by him on the teats and udders of cows. He used the emasculatome on lambs in castrating and docking. He did a double cryptorchid operation on a rodeo horse that was owned by a wild west show. Said horse made a rapid recovery and will soon be ready for the bucking ring in the show.

Dr. Ferguson also did some remarkable operations on a pregnant cow. This cow was a grade Hereford, having a six- to seven-months-old calf in her. She was not sick but used to demonstrate two major operations. Dr. Ferguson demonstrated a subdural injection of 25 cc of a 2 per cent solution of procaine. The cow was cast and he demonstrated his method of doing a rumenotomy, for inspecting the contents of the reticulum, the omasum and unloading and flushing the rumen. After carefully and dexterously closing the rumen, he pulled the gravid right horn of the uterus through the opening in the left side of the abdomen. Then he opened the uterus, removed a live fetus, and stitched up the uterus with a double row of Lembert sutures. Next he pressed out the corpus luteum in the right ovary and closed the abdominal opening by suturing the peritoneum, muscles and skin separately. The time of the operation was about two hours. The cow was on her feet in a few moments after the completion of the last operation. The placenta came away the second day and the cow is now (2 weeks later) eating in a normal condition. She will be used for dissection and after that eventful career ends, we may report on postmortem findings.

Dr. D. A. Eastman, of Cedar Rapids, Iowa, gave special attention to diseases of dogs and did operations in a very skillful manner. He removed (enucleated) two exophthalmic eyes, according to a new and very practical method. He also operated on an old, long-standing fracture of the femur of a dog. He did two or more ovariotomies in his new and very safe way. He gave clinical demonstrations and operations on some 35 dogs, during the six days of the course. He gave treatment for sore mouth, various kinds of mange, osteomalacia, coccidiosis and parasites. All of the veterinarians were well pleased with his

conservative and accurate operations, methods of diagnosis and treatments.

Dr. I. M. Hays, of the A. P. I. veterinary faculty, gave out a new remedy for follicular mange and exhibited dogs upon which he used it. He also assisted Dr. Eastman in his clinical operations. Other members of the faculty gave lectures and demonstrations.

At night moving pictures on animal diseases were exhibited. The annual banquet, given by the Students' Veterinary Medical Association, was the only social event of the week.

The Alabama Veterinary Medical Association held its annual business meeting February 7, 1930. At this meeting, Dr. C. Thigpen, of Tuscumbia, was elected president, Dr. W. L. Ingram, of Opelika, vice-president, and Dr. C. A. Cary, of Auburn, secretary-treasurer. The next mid-year meeting will be held at Montgomery, July 1.

The following resolutions were unanimously passed by the Association:

1. That the head or director of milk inspection of the State Health Department should be a licensed graduate veterinarian.
2. That the director of meat inspection of the State Health Department should be a licensed graduate veterinarian.
3. That all veterinarians employed in meat and milk inspection shall be graduate licensed veterinarians.
4. That all meat and milk inspection done in Alabama shall be done by licensed graduate veterinarians.
5. That agricultural extension demonstrators, vocational teachers of animal industry in schools and colleges shall confine their work to (a) first aid work for farm or domesticated animals, (b) to teaching or instruction in hygiene and sanitation, and (c) to physiology, and exterior and gross anatomy.
6. That extension and vocational agricultural teachers shall not practice veterinary medicine and surgery.
7. That all tests for diseases of animals, including poultry, shall be done by graduate licensed veterinarians or under their supervision.
8. That all research work in animal diseases shall be directly under the supervision of, or shall be done by, graduate licensed veterinarians.

C. A. CARY, *Dean.*

NEW YORK CITY VETERINARY MEDICAL ASSOCIATION

The regular monthly meeting of the New York City Veterinary Medical Association was held on Wednesday evening, February 5, 1930, at the Academy of Medicine Building, 103rd and Fifth Ave., New York City. Dr. R. J. Garbutt, President, occupied the chair.

Dr. Charles S. Chase, of Bay Shore, Long Island, read a paper on "Animal Psychology." In his discourse, Dr. Chase brought out many interesting facts in connection with animal mentality and its value in treating patients, and likewise their owners.

Dr. J. S. Crawford, of Far Rockaway, Long Island, gave a talk on "Canine Distemper: Its Treatment and Sequelae." He covered the standard treatments for the four types which the practitioner encounters. In the early stages before the animal has broken down and before the discharges become purulent, he advised liberal injections of homologous serum and bacterins.

A discussion of distemper followed, in which Drs. Little, Flaxman, Goodman and Ticehurst took part.

JOHN E. CRAWFORD, *Secretary.*

CONNECTICUT VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Connecticut Veterinary Medical Association was held in Hartford, February 5, 1930.

The following officers were elected: President, Dr. M. Ray Powers, Norwalk; 1st vice-president, Dr. J. J. Kavenek, Hartford; 2nd vice-president, Dr. C. Van Vlandren, Naugatuck; treasurer, Dr. Thomas Bland, Waterbury; secretary, Dr. E. H. Patchen, Milford; Board of Censors, Dr. G. T. Crowley, Chairman, New Britain; Dr. H. C. Balzer, Meriden; Dr. G. W. Loveland, Torrington; Dr. J. R. Morin, Rockville; and Dr. A. T. Gilyard, Waterbury.

Hon. C. L. Johnson, our new Commissioner on Domestic Animals, was elected an honorary member.

E. H. PATCHEN, *Secretary.*

SOUTHEASTERN STATES VETERINARY MEDICAL ASSOCIATION

The fourteenth annual meeting of the Southeastern States Veterinary Medical Association was held at the Jung Hotel, New Orleans, La., February 10-11, 1930. The Louisiana and Mississippi state veterinary medical associations met in conjunction with the larger association.

The program of this meeting was outstanding in every way. Besides a number of leaders in the veterinary profession who were present, there were some from the medical profession and some from other walks of life. The papers and discussions were of a practical nature, the kind that the practitioner enjoys hearing.

The banquet was held the evening of the first day and was followed by a business session, at which the following officers were elected: President, Dr. W. K. Lewis, Columbia, S. C.; 1st vice-president, Dr. E. M. Nighbert, Moultrie, Ga.; 2nd vice-president, Dr. K. U. Jones, Birmingham, Ala.; 3rd vice-president, Dr. G. C. Monroe, Greensboro, N. C.; secretary-treasurer, Dr. M. R. Blackstock, Spartanburg, S. C.

It was decided to change the name of the organization which will henceforth be known as the Southern States Veterinary Medical Association. Birmingham, Ala., was selected for the 1931 meeting, which will be held on the third Monday and Tuesday of January.

The scientific program included the following:

"Johne's Disease," Dr. C. D. Cain, A. & M. College, Miss.
"Black Tongue in Dogs and Its Relation to Pellagra in the Human," Dr. G. A. Wheeler, U. S. Public Health Service.
"Diseases of Swine," Dr. C. E. Salsbery, Kansas City, Mo.
"Breeding Problems," Dr. J. F. DeVine, Goshen, N. Y.
"Interstate Laws," Dr. W. K. Lewis, Columbia, S. C.
"Rabies as it Appears in Louisiana," Dr. Rigney D'Annoy, New Orleans, La.
"Infectious Anemia," Dr. R. H. Stewart, Indianola, Miss.
"Canine Distemper," Dr. Ashe Lockhart, Kansas City, Mo.
"Clinical Examination of Canine Subjects," Dr. J. V. Lacroix, Evanston, Ill.
"Coccidiosis in Poultry," Dr. D. C. Gillis, Tallahassee, Fla.
"The Use of Calcium Gluconate," Dr. G. G. Graham, Kansas City, Mo.
"The Economic Importance of Intestinal Parasites of Southern Live Stock," Dr. E. M. Nighbert, U. S. B. A. I., Moultrie, Ga.
"Building Resistance in Dogs by the Stimulation of Leucocytes," Dr. K. U. Jones, Birmingham, Ala.

In addition to the scientific papers Mr. Eliot Norton, a prominent business man of New Orleans, spoke on "Agricultural Conditions in Brazil as Compared with Those in the Southeastern United States." Mr. S. W. Green, of the Coastal Plain Experiment Station, McNeill, Miss., described the "Trench Silo." Dr. H. Preston Hoskins, secretary-editor of the American Veterinary Medical Association, spoke on the activities of the national organization.

At the close of the meeting, the members of the Association expressed their appreciation to the men who had come long distances to participate in the program; to the city officials of New Orleans; to the local newspapers for the publicity given the meeting; to the local veterinarians and especially the secretaries of the Mississippi and Louisiana associations for their aid in making the meeting such a success.

M. R. BLACKSTOCK, *Secretary*

MANITOBA VETERINARY ASSOCIATION

The annual meeting of the Manitoba Veterinary Association was held in Winnipeg, February 11, 1930, at the Royal Alexandra Hotel. The chair was occupied by the President, Dr. Owen McGuirk, of Dauphin, and about fifty members from all parts of the Province were in attendance.

The report of the Secretary-Treasurer and Registrar showed the finances of the Association to be in a sound condition, with funds amounting to $612.18 on hand and an active membership of 114.

The report of the Association's delegate, Dr. J. A. Munn, in connection with the formation of a Western Canada Veterinary Association, was received and adopted. A provisional organization has been formed, with provisional officers, subject to endorsation at a representative meeting from all western provincial associations, to be held at Saskatoon, in August next. It was decided that the proposal to form a Dominion-wide veterinary association be left in the hands of the newly formed western body, with the object that it get together with the eastern provincial associations on the matter.

A committeee was appointed to go further into the matter of practitioners being given a greater opportunity of taking part in bovine tuberculosis eradication work carried on by the federal Health of Animals Branch, also in sanitary inspection work in cities, towns and municipalities.

A summer clinic will be held again this year at Brandon.

The following officers were elected for the ensuing year: President, Dr. H. H. Ross, Brandon; vice-president, Dr. J. B. Still, Winnipeg; secretary-treasurer and registrar, Dr. Wm. Hilton, Winnipeg; Council, Dr. Owen McGuirk, Dauphin; Dr. H. H. Ross, Brandon; Dr. Wm. Hilton, Winnipeg; Dr. J. A. Swanson, Manitou; Dr. H. R. McEwen, Stonewall; Dr. J. B. Still, Winnipeg; and Dr. J. R. Fisher, Brandon; Board of Examiners, Dr. J. B. Still, Winnipeg; Dr. H. R. McEwen, Stonewall; and Dr. Wm. Hilton, Winnipeg; Auditors, Dr. B. C. Flook, Winnipeg; and Dr. R. H. Lay, Winnipeg.

At the afternoon session the meeting was addressed by Mr. J. H. Evans, Deputy Minister of Agriculture for the Province, on conditions pertaining to the health of live stock in the Province. Dr. A. L. Alton, of Portage la Prairie, spoke on "Present-Day Conditions Affecting the Practitioner." Dr. H. H. Ross, of

Brandon, gave a synopsis of the various operations and demonstrations carried out at the 1929 summer clinic; also some observations on the A. V. M. A. clinic at Detroit, last year. A well-prepared and practical paper on "Mineral Deficiency" was presented by Dr. H. R. McEwen, of Stonewall, while Dr. H. R. Tingley, of Winnipeg, spoke on "Parasites of the Mink" and the use of the microscope in detecting and determining various species of parasites.

WM. HILTON, *Secretary.*

NORTHEASTERN PENNSYLVANIA VETERINARY MEDICAL CLUB

A meeting of the Northeastern Pennsylvania Veterinary Medical Club was held at the Terminal Hotel, Wilkes-Barre, February 20, 1930, at which time the members had the pleasure of hearing Dr. E. L. Stubbs, of the Veterinary School, University of Pennsylvania, who addressed the Club on "Hog Diseases"; also Dr. J. H. Winstanley, of the Pennsylvania Bureau of Animal Industry, who talked on "Swine Disease Control in Pennsylvania."

Dr. H. R. Church, deputy state veterinarian of Pennsylvania, gave a general talk on the work done by veterinarians in the State relative to the prevention of diseases among cattle. A talk also was given by Dr. F. A. Marshall, Pennsylvania Bureau of Animal Industry, on the eradication of Bang disease among cattle in the State.

There was also a lively discussion pertaining to the new law that has gone into effect, covering dairy inspection in the state of Pennsylvania.

There were twenty-two veterinarians in attendance.

T. D. JAMES, *Secretary.*

TWIN CITY VETERINARY MEDICAL ASSOCIATION

The Twin City Veterinary Medical Association held another of its meetings in the Veterinary Building at University Farm, St. Paul, Minn., Thursday evening, February 27, 1930. Parturient paresis was the general topic for discussion. About forty veterinarians were in attendance.

The application of the knowledge and methods of physiologists and chemists to studies on milk fever has contributed much to the elucidation of some of its obscurities, with promises of the

ultimate solution of the problem. Hyper- and hypoglycemia and hypocalcemia have been attributed as primary etiological factors, from results of blood chemistry studies. This aspect of the matter is causing much academic discussion at the present time.

Dr. W. L. Boyd, of the Division of Veterinary Medicine, opened the discussion. He gave a historical sketch of the theories and ideas as to the cause and treatment for this disease and then presented the clinical features. The hypothetical bases for the present concepts of the cause of milk fever were discussed by Dr. W. E. Peterson, of the Division of Dairy Husbandry. Very briefly he presented some of the results of the blood studies and milk secretion phenomena and advanced the opinion that the most likely cause of milk fever is a hypocalcemia.

After the literary part of the program, a purebred Jersey cow was brought in and by the intravenous injection of sodium citrate a hypocalcemic condition was produced. This was characterized clinically by marked paralysis and coma, and the animal assuming a recumbent position (stretched out on the floor). She was then given 120 cc of a 10 per cent calcium chlorid solution intravenously and, within a minute and a half, the cow regained her feet and appeared normal again. She subsequently walked to the stable and has since not shown any evidence of illness. This demonstration provoked a lively discussion among those in attendance and the speakers were accorded a hearty vote of appreciation. Several of the veterinarians reported results they had secured by using calcium chlorid on cases of milk fever as met with in their practices. Their results were very gratifying and encouraging.

March Meeting

The March meeting of the Association, held Thursday evening, March 27, was devoted to a discussion of lymphoid hyperplastic diseases. Dr. W. H. Feldman, of the Mayo Foundation, at Rochester, made the formal presentation. Such diseases as leukemia, lymphosarcoma, Hodgkin's round-cell sarcoma, and chloroma, according to Dr. Feldman, are representative of the lymphoid hyperplastic conditions, and he suggested they be included under the general term of lymphoblastomata. A further very general subdivision would be that lymphomata represent the benign lymphoid hyperplasias, and lymphocytomata the malignant ones. The paper was augmented by lantern-

slides depicting the gross and microscopic pathology of a number of well-selected cases.

Dr. G. E. Totten, B. A. I. inspector-in-charge at South St. Paul, told of the many cases of lymphoblastoma observed in cattle on the killing-floor. Drs. W. L. Boyd, H. C. H. Kernkamp and R. Fenstermacher, of the University of Minnesota, told of several cases they had encountered in cattle, swine and poultry.

H. C. H. KERNKAMP, *Secretary.*

Hudson Valley Veterinarians to Meet at Pearl River

Invitations have been extended to the members of the Veterinary Medical Association of New York City, the New Jersey Veterinary Medical Association and the Connecticut Veterinary Medical Association to attend the regular meeting of the Hudson Valley Veterinary Medical Association at the Lederle Laboratories, Pearl River, N. Y., on May 14. A special program has been arranged, which will begin at 11:00 a. m. Luncheon will be served by the Lederle Laboratories at one o'clock. The ladies have been invited to be present.

Stock Feeds Violate Federal Law

Twenty-six seizures of stock feeds were made under the federal Food and Drugs Act in the eastern inspection district of the Food, Drug and Insecticide Administration of the U. S. Department of Agriculture during the year ending December 31, 1929, according to W. R. M. Wharton, District Chief. The eastern district includes all the Atlantic Coast states, Vermont, Pennsylvania and West Virginia.

The seizures covered 10 consignments of cottonseed meal, 2,145 sacks in all; 14 consignments of mixed feeds and miscellaneous feed products, totaling 2,833 sacks; and 2 shipments, or 35 sacks, of beef scrap. In addition to these seizures, 27 citations to hearings were issued to manufacturers and shippers on charges of violating the act, 2 cases have been referred to the solicitor of the Department of Agriculture for prosecution, and others may follow.

The principal violations encountered, according to Mr. Wharton, were deficiencies in protein and fat, excessive crude fiber, and labels and tags bearing improper declarations of ingredients of the feeds.

NECROLOGY

NORMAN C. POWELL

Dr. Norman C. Powell, of Cleveland, Ohio, died on February 8, 1930, of heart disease.

Born at Hanover, Ohio, June 23, 1869, Dr. Powell attended Ohio State University and was graduated in 1895. He entered the service of the U. S. Bureau of Animal Industry in January, 1902, and was in charge of the Allentown, Pa., station for several years, before being transferred to Cleveland. He was a supervisor at the latter station for more than twelve years.

Dr. Powell joined the A. V. M. A. in 1918.

CHARLES E. CLAYTON

Dr. Charles Edward Clayton, of New York City, died March 9, 1930. The cause of death was arteriosclerosis and cerebral hemorrhage.

Born in Springfield, Mass., October 18, 1867, Dr. Clayton attended the American Veterinary College in New York City and was graduated in 1893. For seven years following his graduation, Dr. Clayton was House Surgeon at the College. In 1900 he entered private practice. While acting as House Surgeon he also was Adjunct to the Chair of Practical Operative Surgery and Demonstrator of Anatomy.

On November 28, 1917, Dr. Clayton was appointed major in the U. S. Army Veterinary Corps and was sent to France the following March, with the 3rd Division. Later he was transferred to the Fifth Army Corps, and remained in France until after the Armistice. He returned home in the spring of 1919, and was honorably discharged June 3, 1919. Several weeks later he was appointed major in the Veterinary Reserve Corps, and on June 30, 1922, was promoted to the rank of lieutenant-colonel. He was also a captain in the 51st Machine Gun Squadron, more generally known as Squadron A.

Dr. Clayton joined the A. V. M. A. in 1894 and at the time of his death was the sole remaining member who joined the Association that year. He was also a member of the New York State Veterinary Medical Society and the Veterinary Medical Association of New York City.

Dr. Clayton was very highly respected in veterinary circles. He was a successful teacher and equally successful as a practitioner. He made an enviable record as an Army officer and his sterling qualities endeared him to every one with whom he came in contact.

W. J. HINMAN

Dr. W. J. Hinman, of Winnipeg, Manitoba, died February 27, 1930, at the age of 75 years. He was graduated from the Ontario Veterinary College in 1875 and was one of the founders of the Veterinary Association of Manitoba. At different times he held various executive offices in the Association. He practiced in Winnipeg for over fifty years.

Dr. Hinman joined the A. V. M. A. in 1896. He is survived by one daughter.

GEORGE RALPH GRAVES

Dr. G. Ralph Graves, of Indianapolis, Indiana, died suddenly while riding in a street car in Indianapolis, March 24, 1930. Death was due to cerebral hemorrhage.

Born in Thorntown, Ind., in 1883, Dr. Graves attended local grade and high schools and the Chicago Veterinary College. He was graduated from the latter institution in 1910 and returned to Thorntown, where he engaged in private practice for a short time. He then entered the service of the U. S. Bureau of Animal Industry and was assigned to meat inspection at Chicago. Later he was transferred to serum-virus control at Thorntown. About eight years ago, he was transferred to Indianapolis and stationed at the Kingan Packing plant.

Dr. Graves is survived by his widow (nee Florence Kessler), one son, one daughter and one sister.

BENJAMIN F. KIMBALL

Dr. Benjamin F. Kimball, of New Berlin, Ill., died March 31, 1930, after an illness dating back two years.

Born near Pana, Ill., July 17, 1875, Dr. Kimball attended local schools and later the Chicago Veterinary College, from which he was graduated in 1905. He was engaged in general practice up to the time of his fatal illness.

Dr. Kimball is survived by his widow (nee Cora McKeown), one son and one daughter.

ELMER E. JOHNSON

Dr. Elmer E. Johnson, of Detroit, Mich., died March 31, 1930, after a very brief illness. Autopsy revealed inflammation of the brain, following a recent concussion.

Born at LeRoy, Mich., August 24, 1898, Dr. Johnson attended local schools and the Ferris Institute, at Big Rapids. He then entered Michigan State College and received his veterinary degree in 1926. He practiced at Ironton, Ohio, as an assistant to Dr. G. A. Handley, and later in Detroit, as an assistant to Dr. Willis L. Brenton. On July 1, 1928, he entered the service of the Detroit Board of Health, as veterinary inspector, and was on meat inspection work at the time of his fatal illness.

Dr. Johnson joined the A. V. M. A. in 1929. He was also a member of the Southeastern Michigan Veterinary Medical Association.

JACOB I. DEADMAN

Dr. J. I. Deadman, of North Bay, Ontario, died April 2, 1930. He was the oldest of eight sons of Dr. W. H. Deadman. Seven of the eight brothers were veterinarians and only three of them are now living: Dr. John F. Deadman, of Sault Ste. Marie, Mich., Dr. Richard H. Deadman, of Alpena, Mich., and Dr. Charles A. Deadman, of Madison, Wis. The five deceased are Dr. J. I. Deadman, Dr. W. Deadman, Dr. Austin W. Deadman, Dr. P. A. Deadman and Dr. B. B. Deadman.

Dr. J. I. Deadman made his home at Sault Ste. Marie for about fifteen years. He left the Sault about twenty years ago. His grandfather, Dr. Jacob Deadman, was also a veterinarian in England.

JOSEPH B. JOHNSTON

Dr. Joseph B. Johnston, of Gallipolis, Ohio, died April 6, 1930, of apoplexy. He was 67 years of age and was a graduate of the Ontario Veterinary College, class of 1891.

GEORGE R. WEISE

Dr. George R. Weise, of Princeton, Illinois, died at his home, April 6, 1930. Death was the result of heart disease, according to report.

Born in Ohio Town, in 1862, Dr. Weise had been a resident of Bureau County all his life. He received his veterinary education at the Chicago Veterinary College, and was graduated in 1903. He is survived by his widow, one daughter, one brother and one sister.

PERSONALS

MARRIAGES

Dr. C. R. Omer (K. S. A. C. '29) to Miss Jessie Kelley, both of Wichita, Kansas, March 31, 1930, at Wichita.

Dr. J. B. Hagenbuch, Jr. (U. P. '28), to Miss Louise Jeffers, both of Plainsboro, N. J., April 8, 1930, at Plainsboro.

BIRTHS

To Dr. and Mrs. Daniel DeCamp, of Wichita, Kans., a son, Howard Stadler, March 23, 1930.

To Dr. and Mrs. H. H. Clark, of Perry, Mich., a son, Hollis H., Jr., March 27, 1930.

To Dr. and Mrs. M. L. Morris, of New Brunswick, N. J., a daughter, Ruth Louise, April 4, 1930.

PERSONALS

Dr. L. H. Conlon (Corn. '23), of Towanda, Pa., is now located at Ulster, Pa.

Dr. M. A. Davies (Ont. '90), of Troy, Pa., spent the winter in Miami, Fla.

Dr. W. R. Lee (K. C. V. C. '16) has removed from Redding, Calif,. to Reno, Nevada.

Dr. Floyd W. Young (Mich. '29) has located for general practice at Williamston, Mich.

Dr. W. F. Fisher (Colo. '23), formerly located at Yerington, Nev., is now at Fallon, Nev.

Dr. C. E. Swink (Iowa '27), formerly of Dunnell, Minn., is now located in Hibbing, Minn.

Dr. Roy V. Loudon (O. S. U. '24) has removed from McCook, Nebr., to Hastings, Nebr.

Dr. Hiram L. Poole (Chi. '06) has removed from Long Beach, Calif., to Patterson, Calif.

Dr. Melvin A. Taylor (Ind. '12), formerly located at West Salem, Ill., has removed to Arcola, Ill.

Dr. C. L. Woolard (Chi. '17), of Benton, Ill., recently purchased a 120-acre farm near Hillsboro, Ill.

Dr. John J. McCrillis (O. S. U. '23), formerly located in Pasadena, Calif., is now in Rosemead, Calif.

Dr. J. G. Porter (Ind. '11), formerly of Lubbock, Texas, is now located at Amarillo, Texas. P. O. Box 85.

Dr. L. E. Stanton (Iowa '25), formerly of Burt, Iowa, has located in Jackson, Minn., for general practice.

Dr. Fred M. Shigley (Mich. '23) has removed from Rolette, N. Dak., to Fargo, N. Dak. Address: 6½ Roberts St.

Dr. E. H. Meyer (St. Jos. '23), who has been located in Ames, Iowa, is now in Lincoln, Nebr. Address: 2116 South 22nd St.

Dr. James S. Hogg (U. P. '24), who has been located in Wilkes Barre, Pa., for a number of years, has removed to Cochranville, Pa.

Dr. L. E. Chapin (Chi. '14), formerly of Camden, Mich., has removed to Shipshewana, Ind., where he will conduct a general practice.

Dr. J. H. Jefferson (Ont. '06) has disposed of his office in Cleveland Heights, Ohio, and is now permanently located at Chagrin Falls, Ohio.

Dr. Walter Wisnicky (K. S. A. C. '26), has requested a change of address from Fond du Lac, Wis., to 2130 E. Mifflin Street, Madison, Wis.

Dr. E. C. Goodrich (Gr. Rap. '15), of Kalamazoo, Mich., has been on a 20,000-mile automobile trip and expects to return home about May 1.

Dr. A. P. Immenschuh (K. S. A. C. '14) is Chief of the Division of Animal Industry, Cooperative Health Department, San Diego County, Calif.

Dr. T. A. Newlin (K. S. A. C. '28), who has been located at the Dixie National Stock Yards, Memphis, Tenn., has removed to Rocky Ford, Colo.

Dr. E. C. Howe (Colo. '29), formerly of Troublesome, Colo., is now located in Brighton, Colo., where he is associated with Dr. George H. Carr (Colo. '18).

Dr. C. H. McNabb (Ont. '06), of Vancouver, British Columbia, has returned to his former location at Snowflake, Manitoba, where he is engaged in general practice.

Dr. E. M. Dobbs (K. S. A. C. '16), who has been at the Fairmont Hospital, San Leandro, Calif., is now located in Oakland, Calif. Address: 15400 Foothill Blvd.

Dr. Gerald R. Dowd (K. S. A. C. '25), who has been at the New York State Veterinary College, Ithaca, N. Y., is now at the Saranac Laboratory, Saranac Lake, N. Y.

Dr. H. W. Gardner (Corn. '18) is now in the employ of the New York City Board of Health and conducts a private practice at 7206 Metropolitan Avenue, Forest Hills, L. I., N. Y.

Dr. Emlen Wood (U. P. '16), of Greenwich, N. J., has accepted a position with the Supplee-Wills-Jones Milk Company, of Philadelphia, and has been stationed at Phoenixville, Pa.

Dr. L. M. Tarbill (O. S. U. '26) has resigned his position with the Ohio State Bureau of Animal Industry and has located at New Holland, Ohio, where he will conduct a general practice.

Dr. C. S. Hayward (Ont. '02), of Mattoon, Ill., lost his hospital and garage by fire the night of March 24. Everything in the building was destroyed and the damage estimated at $2,000.

Dr. Frank E. Metcalf (McK. '12), who for the past year has been associated with Dr. A. M. Henderson, of Aurora, Ill., has located at Geneva, Ill., where he will conduct a general practice.

Dr. Arnold A. Feist (U. P. '12), of St. Paul, Minn., recently moved into a very up-to-date new hospital, a short distance from his old location. The new quarters are at 1046 University Avenue.

Dr. W. N. Armstrong (Ont. '94), of Concord, Mich., was bitten on the left arm by a horse affected with rabies, the latter part of March, and considered it advisable to undergo the Pasteur treatment.

Dr. R. V. Rafnel (Cin. '11), formerly state veterinarian of Mississippi, has returned to the service of the U. S. Bureau of Animal Industry, and has been assigned to Baltimore, Md., in meat inspection.

Dr. B. L. Strohl (Ind. '08), who has been with the Illinois State Department of Agriculture for the past six years, has opened an office and hospital in Paris, Ill., where he will engage in general practice.

Dr. M. H. Taylor (Ont. '16), formerly of Carberry, Manitoba, Veterinary Inspector employed by the Health of Animals Branch, Canada Department of Agriculture, has located at Yorkton, Saskatchewan.

Dr. Roy E. Willie (St. Jos. '22), formerly stationed in Chicago on poultry inspection, with the Bureau of Agricultural Economics, has been transferred to Dundee, Mich., at the plant of the Raisin Brook Packing Co.

Dr. Ronald L. Hectorne (O. S. U. '28), who has been a member of the staff of the Animal Pathology Laboratory, University of Illinois, has accepted an appointment in the New Jersey Bureau of Animal Industry, at Trenton.

Dr. B. W. Boyd (K. C. V. C. '07), who has been a member of the tuberculosis eradication force of the B. A. I. in Texas, has resigned and entered a partnership with Dr. H. L. Rhea (K. C. V. C. '05), of San Antonio, Texas.

Dr. Benj. McInnes (R. C. V. S. '74), of Charleston, S. Car., takes an active interest in the horse shows held in his part of the country. Shows have been held recently at Camden, Summerville, Savannah, Augusta and Charleston.

Dr. B. Kater McInnes (U. P. '11), of Charleston, S. C., was elected vice-president of the Association of Food and Drug Officials of the Southeastern States, at the annual meeting held in Augusta, Ga., the latter part of March.

Dr. J. H. Krichel (Chi. '16), of Alexis, Ill., has been compelled to dispose of his practice, owing to ill health. Both the practice and the hospital of Dr. Krichel has been purchased by Dr. R. M. Carter (Chi. '20), of Chillicothe, Ill.

Dr. C. H. Decker (O. S. U. '10), of Columbus, Ohio, was kicked on the leg above the knee by a large Shorthorn cow, while applying the tuberculin test recently. Dr. Decker was confined to the hospital for several days, although no bones were broken.

Dr. Roscoe Hyde (Ind. '17), of Muncie, Ind., has been appointed veterinarian to the 76th Brigade, Indiana National Guard. Previous to his latest appointment, Dr. Hyde held a commission as captain in the 113th Veterinary Company of the 113th Medical Regiment.

Dr. T. A. Sigler (Ind. '02), of Greencastle, Ind., addressed a gathering of farmers at the local high school, on February 25, on the subject of swine sanitation. The meeting was one of a series being held each Tuesday evening, at which prominent citizens speak on various topics.

Dr. M. J. Harkins (U. P. '12) lecturer in veterinary medicine at the University of Pennsylvania, presented a paper, entitled, "Immunizing Properties of Staphylococcus Aureus Toxin," before the section on General Medicine at the College of Physicians, Philadelphia, Pa., on February 24.

Dr. F. P. Mathews (Colo. '23), who has been a member of the staff of the Veterinary Department of Purdue University for a number of years, has resigned to accept a position with the A. & M. College of Texas. Dr. Mathews is located at Alpine, Texas, and is studying loco poisoning. The project is a joint one, with the U. S. Department of Agriculture cooperating.

Dr. Werner Runge (Royal Vet. School Berlin '79), chief veterinarian of the Newark, N. J., Health Department, celebrated his 75th birthday on March 30, 1930. He was surprised at his home in Madison, N. J., on that day, by a group of the members of the Veterinary Bureau of the Health Department, who called and presented him with a floral piece consisting of seventy-five roses, and a congratulatory scroll signed by eleven members of Dr. Runge's force. Dr. Runge has been with the Health Department for forty-two years and is the oldest living employe of the Department.

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